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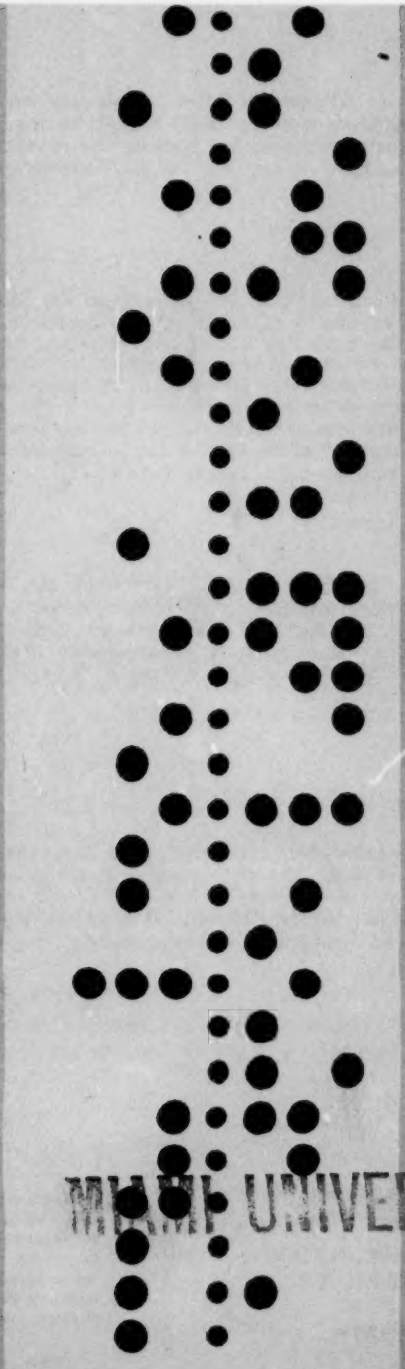
January 5, 1966

U.S. GOVERNMENT RESEARCH & DEVELOPMENT REPORTS



JAN 28 1966

Semi-Monthly Journal

- *Abstracts of R & D Reports*
- *List of Current R & D Projects*
- *Indexes*

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January 5, 1966 / Volume 41, Number 1

U.S. Government

RESEARCH AND DEVELOPMENT REPORTS

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PURPOSE

U.S. Government Research & Development Reports announces the availability of new reports of U.S. Government-sponsored R&D released by the Department of Defense, the Atomic Energy Commission, National Aeronautics & Space Administration, and other agencies. It also lists current Government-sponsored R&D projects.

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Reports announced herein are available to the public from the Clearinghouse, or in some cases from other sources as noted. Order reports by accession/report (Stock Number) given on the first line of each entry and title from the Clearinghouse, U. S. Department of Commerce, Springfield, Va. 22151, or from any Department of Commerce Field Office (listed on inside back cover). Prices for hard copy (HC) and microfiche copy (MF) are given in the entry. Prepayment is required unless purchases are to be charged to Clearinghouse deposit accounts. Order forms are provided at the back of this journal. Make check or money order payable to National Bureau of Standards—CFSTI.

OTHER JOURNALS

NASA and AEC documents announced in this publication are also abstracted—along with other mission-oriented material—in the NASA journal *Scientific and Technical Aerospace Reports*, and the AEC journal *Nuclear Science Abstracts*. These publications are sold on subscription by Superintendent of Documents: *STAR* at $33 a year ($9 additional for foreign mailing); *NSA* at $30 a year ($7 additional for foreign mailing).

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U.S. DEPARTMENT OF COMMERCE
John T. Connor, Secretary

CLEARINGHOUSE FOR FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION
Springfield, Va. 22151
Bernard M. Fry, Director

Contents may be printed freely. Mention of source will be appreciated. Use of funds for this publication approved by the Director of the Bureau of Budget, June 30, 1961.

special ANNOUNCEMENTS

USGRDR NOW CONTAINS DATA ON CURRENT R AND D PROJECTS

Beginning in this issue, U. S. Government Research and Development Reports will contain a section announcing current Government R and D projects in the physical sciences, engineering and related technology. This service is designed to promote active interchange between research workers in the same or related fields by providing current awareness information on who is doing what research where.

Information published will include the project title, performing organization, principal investigator, and term of contract or grant. The information is obtained by the Clearinghouse from the Science Information Exchange (SIE) of the Smithsonian Institution, to which Federal agencies report their new projects. This service will be expanded later to include current development projects not normally reported to SIE.

This new Clearinghouse service will fill an information need long recognized by the Government and the scientific and technical community. It is one of the missions specified for the Clearinghouse by the Federal Council for Science and Technology.

PHOTOCOMPOSITION OF USGRDR

The two principal sections of USGRDR--Technical Abstract Bulletin (TAB) and Other Research Reports and Related Material--are now prepared on computer-actuated equipment.

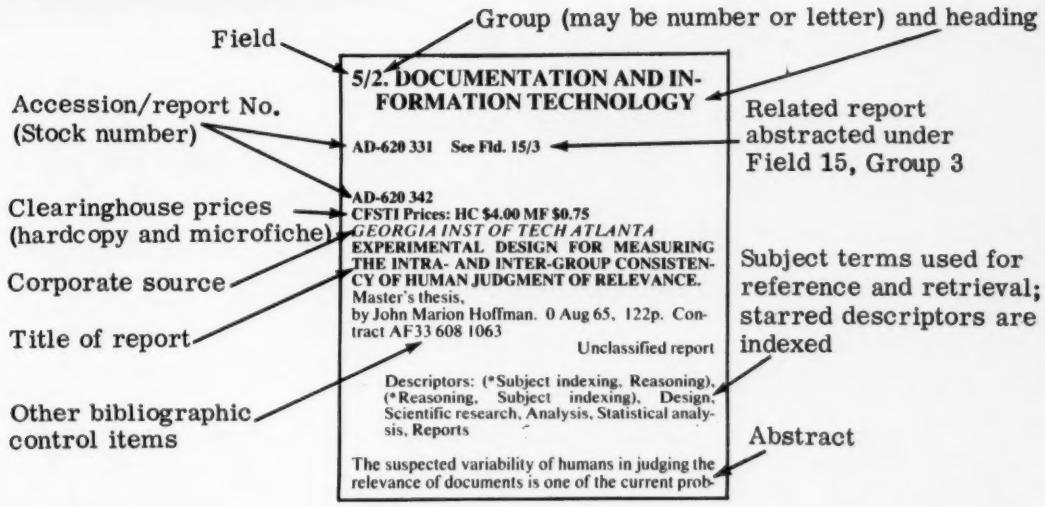
Automatic photocomposition of the USGRDR starts with the document records (indexing data and abstracts) prepared on punched paper tape at the Clearinghouse. This tape is then put through a series of computer conversion processes for insertion into automatic photocomposition equipment at the U. S. Government Printing Office. From the final computer input the photocomposition equipment produces page length columns with justified margins. These columns are then assembled into complete journal pages for photo-offset printing.

Apart from serving the interests of speed and economy, advantages of the new format are the contrasting type faces and greater compactness, making the entries easier to scan. Of more intrinsic value is the new computer-directed cross reference system now used in the TAB section that refers the reader to related reports announced under other Fields and Groups; see the sample entry on the opposite page. The Other Reports Section will have this feature soon.

HOW TO USE
U S G R D R

Entries are arranged under 22 subject categories called FIELDS. In the "Technical Abstract Bulletin" section, FIELDS are divided into sub-categories called GROUPS and occasionally subgroupings are also used. Documents are listed alpha-numerically (that is, alphabetic data precedes numerical data) by accession/report number. Although differing slightly in printing format, entries in the various sections contain essentially the same information.

- TECHNICAL ABSTRACT BULLETIN
- OTHER RESEARCH REPORTS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Master's thesis,
by John Marion Hoffman. 0 Aug 65, 122p. Contract AF33 608 1063
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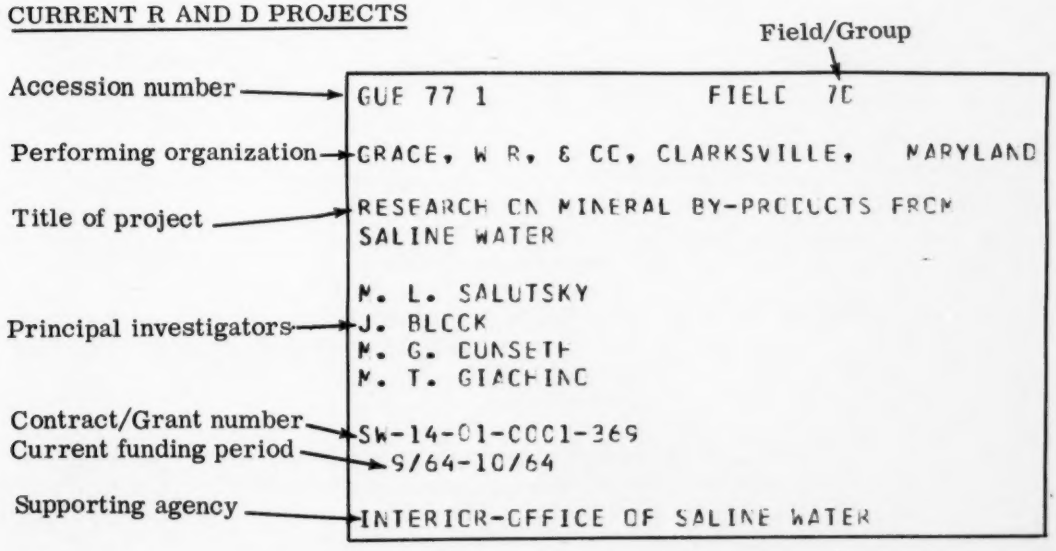
- CURRENT R AND D PROJECTS



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SUBJECT CATEGORY HEADINGS

01	AERONAUTICS	1, S-1
	Includes aerodynamics; aeronautics; aircraft; aircraft flight control and instrumentation; and air facilities.	
02	AGRICULTURE	3, S-2
	Includes agricultural chemistry; agricultural economics; agricultural engineering; agronomy and horticulture; animal husbandry; and forestry.	

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03	ASTRONOMY AND ASTROPHYSICS	3, S-2
	Includes astronomy; astrophysics; and celestial mechanics.	
04	ATMOSPHERIC SCIENCES	4, S-3
	Includes atmospheric physics and meteorology.	
05	BEHAVIORAL AND SOCIAL SCIENCES	7, S-5
	Includes administration and management; documentation and information technology; economics; history, law and political science; human factors engineering; humanities; linguistics; man-machine relations; personnel selection, training, and evaluation; psychology (individual and group behavior); and sociology.	
06	BIOLOGICAL AND MEDICAL SCIENCES	14, S-7
	Includes biochemistry; bioengineering; biology; bionics; clinical medicine; environmental biology; escape, rescue, and survival; food; hygiene and sanitation; industrial (occupational) medicine; life support; medical and hospital equipment and supplies; microbiology; personnel selection and maintenance(medical); pharmacology; physiology; protective equipment; radiobiology; stress physiology; toxicology; and weapon effects.	
07	CHEMISTRY	22, S-11
	Includes chemical engineering; inorganic chemistry; organic chemistry; physical chemistry; and radio and radiation chemistry.	
08	EARTH SCIENCES AND OCEANOGRAPHY	29, S-15
	Includes biological oceanography; cartography; dynamic oceanography; geochemistry; geodesy; geography; geology and mineralogy; hydrology and limnology; mining engineering; physical oceanography; seismology; snow, ice, and permafrost; soil mechanics; and terrestrial magnetism.	
09	ELECTRONICS AND ELECTRICAL ENGINEERING	33, S-15
	Includes components; computers; electronic and electrical engineering; information theory; subsystems; and telemetry.	
10	ENERGY CONVERSION(Non-Propulsive)	41, S-18
	Includes conversion techniques; power sources; and energy storage.	

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11 MATERIALS 42, S-19

Includes adhesives and seals; ceramics, refractories, and glasses; coatings, colorants, and finishes; composite materials; fibers and textiles; metallurgy and metallography; miscellaneous materials; oils, lubricants, and hydraulic fluids; plastics; rubbers; solvents, cleaners, and abrasives; and wood and paper products.

12 MATHEMATICAL SCIENCES 45, S-24

Includes mathematics and statistics and operations research.

13 MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING 51, S-25

Includes air conditioning, heating, lighting, and ventilating; civil engineering; construction equipment, materials, and supplies; containers and packaging; couplings, fittings, fasteners, and joints; ground transportation equipment; hydraulic and pneumatic equipment; industrial processes; machinery and tools; marine engineering; pumps, filters, pipes, tubing, fittings, and valves; safety engineering; and structural engineering.

14 METHODS AND EQUIPMENT 54, S-28

Includes cost effectiveness; laboratories, test facilities, and test equipment; recording devices; reliability; and reprography.

15 MILITARY SCIENCES 56, S-29

Includes antisubmarine warfare; chemical,biological, and radiological warfare; defense; intelligence; logistics; nuclear warfare; and operations, strategy, and tactics.

16 MISSILE TECHNOLOGY 56, S-30

Includes missile launching and ground support; missile trajectories; missile warheads and fuzes; and missiles.

17 NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES 56, S-30

Includes acoustic detection; communications; direction finding; electromagnetic and acoustic countermeasures; infrared and ultraviolet detection; magnetic detection; navigation and guidance; optical detection; radar detection; and seismic detection.

18 NUCLEAR SCIENCE AND TECHNOLOGY 59, S-31

Includes fusion devices (thermonuclear); isotopes; nuclear explosions; nuclear instrumentation; nuclear powerplants; radiation shielding and protection; radioactive wastes and fission products; radioactivity; reactor engineering and operation; reactor materials; reactor physics; reactors (power); reactors (non-power); and SNAP technology.

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19 ORDNANCE 60, S-43

Includes ammunition, explosives; bombs; combat vehicles; explosions, ballistics, and armor; fire control and bombing systems; guns; rockets; and underwater ordnance.

20 PHYSICS 61, S-45

Includes acoustics; crystallography; electricity and magnetism; fluid mechanics; masers and lasers; optics; particle accelerators; particle physics; plasma physics; quantum theory; solid-mechanics; solid-state physics; thermodynamics and wave propagation.

21 PROPULSION AND FUELS 73, S-50

Includes air-breathing engines; combustion and ignition.

22 SPACE TECHNOLOGY 75, S-51

Includes astronautics; spacecraft; spacecraft trajectories and reentry; and spacecraft launch vehicles and ground support.

RESEARCH highlights

Reports of current high industrial interest

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Wood and Paper xv
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Electronics

CHEMICAL FORMATION OF MICROCIRCUIT ELEMENTS

(Order AD-613 563 Chemical Formation of Microcircuit Elements, HC $4.00/ MF $0.75.)

Sputtered titanium resistors and capacitors can be used in microcircuits, according to Weston Instruments. The various deposition techniques are mutually compatible so that passive components can be deposited by successive sputtering operations on the same substrate supplemented by evaporation runs for capacitor electrodes and interconnections. The attractive features of the titanium resistors are that they attain stability in the unprotected state and remain quite stable thereafter. The deposition is reproducible and the temperature coefficient is near zero around 20-50 ohms per square. Below this value the TCR is positive and becomes increasingly negative at higher values. Power dissipation is reasonably high, even on glass. Temperature cycling in the range of minus 55°C to plus 200°C does not lead to hysterisis or to any permanent change in the resistance. Meandering patterns can be made through etching or masking. TiO2 capacitors are even better as microcircuit components, the investigators say. Dielectric constants over 100 are reproducibly attained and capacitances of one microfarad per square centimeter are easily produced. The unprotected capacitors have good stability over long periods of time and losses are reasonably small.

VERSATILE TRANSISTOR AMPLIFIER DEVELOPED

(Order AD-619 650 A Broadband Complementary Transistor Amplifier, HC $2.00/MF $0.50.)

A new two stage NPN-PNP complementary transistor amplifier with great versatility over a broad frequency range has been developed by the Naval Ordnance Test Station. The use of complementary transistors allows negative voltage feedback to maximize the performance of the amplifier. This configuration provides a very stable gain over a broad frequency range coupled with high input impedance and low output impedance. Good DC bias stability and low noise are also characteristic of the circuit. Because of the wide applications of the amplifier, a general analysis was made by the researchers to determine optimum parameter configurations. This was done to gain information for the designer's use in optimizing the design reliability and stability of the circuit as applied to a number of devices. Particular areas of investigation included a derivation of approximate gain and impedance equations; an exact computer analysis to determine the effect of all the component parameters on circuit performance; and the plotting of trade-off curves showing the relationships of gain, impedances, and stability to feedback and transistor operating points.

Human Factors Engineering

ACTIVITIES AND ATTITUDES OF SCIENTISTS SURVEYED

(Order AD-620 376 Work Activities and Attitudes of Scientists and Research Managers: Data From a National Survey, HC $6.00/MF $1.25.)

A national survey of the activities and attitudes of 4,751 scientists and research managers in the major disciplines of biology, chemistry, mathematics, and physics has been made by the Stanford Research Institute for the Air Force. The survey shows that most of the biologists and mathematicians are employed by universities, the chemists by industry, and the physicists about evenly by colleges, industry, and the Federal Government. One scientist in 20 is a woman, and a majority of both male and female scientists have doctorates in their fields. Those in all four professional groups are more likely to be interested in remaining in research positions than in moving into management, and a sizeable number of research managers wish to return to nonmanagerial posts in the future.

The research work of the large majority of the biologists is supported primarily by Federal grants, and the same is true of about half of the physicists. Four out of 10 mathematicians depend on Federal subsidy, as do 3 out of 10 chemists. Scientists and research managers share responsibility for such funding. Turnover rates are highest at universities and in the aerospace, electronics, and nonmanufacturing industries, while Federal agencies and the food, drug, petrochemical, and manufacturing industries have the lowest traffic in scientists. Scientists and research managers in the aerospace industry tend to be least satisfied with their jobs, while those in nonprofit corporations and the petrochemical industry are most likely to say they are very satisfied. (More)

What scientists consider to be their main problems at work varies considerably in different employment contexts. "Inappropriate management practices" is cited by Stanford as a main problem among scientists in the petrochemical, food, drug, and aerospace industries. Limited or uncertain funding is a major issue in the aerospace and atomic energy industries. An inadequate number of trained technicians was emphasized by scientists in the Federal Government.

Engineering and Construction

STRUCTURAL MATERIALS MADE FROM FLYASH

(Order PB-168 117 A New Approach to the Production of Flyash-Based Structural Materials, HC $1.00/MF $0.50.)

Flyash-based structural materials compare well with American Society of Testing and Materials specifications for clay brick. Flyash is attractive from the standpoint of cost because raw material expense is low and long distance transportation is not normally involved, according to a West Virginia University study. A major byproduct of the combustion of pulverized coal, flyash can be made a structural material by a new approach that involves the use of sand, or grog, in a flyash-sodium silicate mix as an agent to increase workability and to decrease fissuring by providing a path for moisture release. Grog is previously fired, crushed, and ground, and used as an additive. The proper combinations of flyash, sand, and sodium silicate with modest forming pressures also give an unfired product of substantial strength.

Metalworking and Metal Forming

MACHINING AND GRINDING TITANIUM

(Order AD-620 508 Machining and Grinding of Titanium and Its Alloys, HC $4.00/MF $1.00.)

Many of the latest techniques on titanium machining and grinding developed in private industry and in Government-sponsored work are discussed in considerable depth in a manual prepared for NASA by metalworking experts of Battelle Memorial Institute. The document discusses such operations as milling, turning and boring, drilling, tapping and threading, reaming, broaching, precision and belt grinding, and abrasive and band sawing. An entire section is devoted to electrochemical machining of titanium alloys, offering valuable information on equipment, metal-removal rates and tolerance, tooling and fixturing, electrolytes, and grinding. The closing section on chemical milling discusses processing, cleaning, masking, etching, rinsing and stripping, effects on mechanical properties, hydrogen pickup during milling, and estimated processing costs.

A HOW-TO-DO-IT PICTURE MANUAL ON EDM-ECM MACHINING

(Order AD-622 814 Pictorial Journal of EDM-ECM, HC $5.00/MF $1.00.)

An illustrated manual that depicts the many uses of electrical discharge machining (EDM) and electrochemical machining (ECM) has been prepared by the Army's Rock Island Arsenal. This how-to-do-it publication is designed to help Government and industry exploit these processes in situations where conventional machining methods are too difficult or even impossible.

"From an initial limited and special application," says the Rock Island manual, "these processes are finding ever-widening usage and are literally growing by leaps and bounds. Job applications that were once considered a must for conventional machine tools are constantly giving way to these new processes. The economic benefits that are possible, as this journal will show, are so great that one cannot overlook evaluating every job application."

This does not mean that all conventional machining will gradually be replaced by these new manufacturing techniques. "The intent," the manual continues, "is to stimulate and provoke the reader's thinking and interest in the direction of this technology and cost reduction potential."

Rock Island says that EDM and ECM are a solution to machining materials which cannot be economically machined by conventional methods, and for the machining of heat-treated metals, exotic metals, and special alloys which are impossible to machine by conventional methods.

EDM and ECM can also be a solution to machining geometrical configurations which otherwise would have to be partially machined and then hand-worked. The processes can be used to machine without mechanical or thermal distortion and they can eliminate segmentation when machining dies in a single piece configuration. EDM can be used to obtain servo-port shapes and contours that were heretofore impossible to achieve or were impractical from the standpoint of cost, bushing rigidity, and alignment problems.

The Rock Island publication points out that EDM has several features that lend it to production work. EDM can cut any die material at a cost as low as that for steel dies. Worn surfaces of forging dies usually do not require finishing; the die can be taken directly from the machine to the forge hammer. Since the electrode moves into the work automatically, machines can be left unattended for long periods of time.

Optics

ULTRASONIC LASER MODULATION

(Order AD-622 575 Ultrasonic Laser Modulation Techniques, HC $4.00/MF $1.00.)

Ultrasonic laser modulation can be accomplished efficiently through the use of the dynamic wave guide effect generated by propagating focused acoustic waves within a solid state laser. This modulation technique has the advantages of increasing laser output as much as 100 percent, no mode structure in the laser's output, uniform pulse heights, repetitive pulse trains at a controlled frequency, simplicity and reliability, and no insertion of lossy optical elements into the laser's

feedback path. United Aircraft, who did the work for the Army, says it has demonstrated the feasibility of internally gating the output of a doped glass laser by coupling focused acoustic waves from a cylindrical transducer to a laser rod through a liquid medium. This technique eliminates all of the bonding problems associated with flash lamp and stray laser radiation damage encountered with previously reported methods of bonding the transducer directly onto the rod.

Rubber

LOW-TEMPERATURE OIL-RESISTANT ELASTOMERS

(Order AD-619 376 Synthesis of Low-Temperature Oil-Resistant Urethane Elastomers, HC $2.00/MF 50 cents.)

New elastomeric materials have been synthesized by Army researchers for potential use in the extreme cold of the arctic and the high heat of the tropics. Urethane-urea elastomers have been developed with excellent flexibility at -55°C and with resistance to swelling when immersed in ASTM No. 3 oil for 70 hours at 100°C. The key to the preparation of the materials is the concentration of polar linkages and cross-links between long flexible polyether chains. Low temperature flexibility was attained by using the ethylene glycol-tetrahydrofuran polyols to provide the long flexible polyether chains. The Army developers prepared the elastomers with a one-shot processing technique in which the reactants, polyols, diisocyanates and diamines are converted to a solid polymer in a single step. A metal catalyst was used to accelerate the isocyanate-hydroxyl reaction, permitting a more balanced reaction between the diisocyanates and the polyols and diamines.

Transportation

A CALL FOR HIGH SPEED GROUND TRANSPORTATION

(Order PB-168 648 Survey of Technology for High Speed Ground Transportation, Part I, HC $7.85/MF $2.25.)

A long-range and detailed series of suggestions for research and development to advance the technology of high speed ground transportation is contained in a report compiled by the Massachusetts Institute of Technology for the Department of Commerce. The researchers say it would be feasible within the next 15 years to create an entirely new system of high speed ground transportation provided research and development is launched within the current fiscal year.

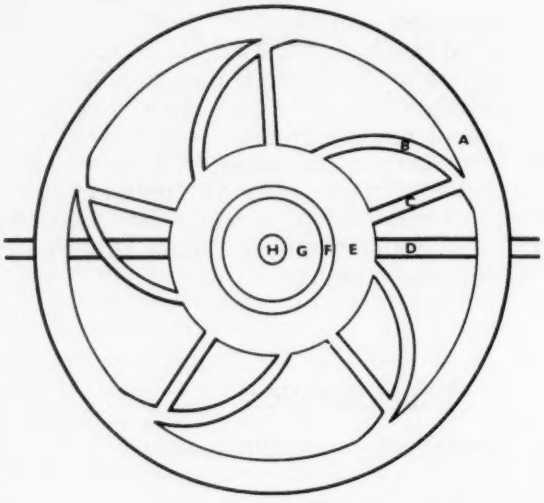
The MIT report says at least two years of research and development would be required before decisions could be reached on the kind of new system that might be developed, but it cites several possible forms the new facility might take. These include "trains" capable of speeds in excess of 200 miles an hour, traveling on cushions of air within enclosed guideways (tunnels) or in U-shaped troughs. Station stops would be eliminated by transferring passengers to local loops by "capsule" exchange.

CIRCULAR RUNWAY DESIGN PROPOSED FOR AIRPORTS

(Order AD-622 152 The Circular Runway, HC $2.00/MF $0.50.)

The Navy says a circular runway for aircraft is "extremely attractive from a safety standpoint." Jet fighters, conventional propeller aircraft, and 4-engine transports have successfully made takeoffs and landings at a circular test track near Williams Air Force Base, Arizona, proving the wheel-like design is a valid concept.

According to the Navy, the circular runway allows unlimited flexibility in planning approach and departure corridors and landings, always into the prevailing wind. It requires minimum taxi distance and, with the tower in the center of the complex, permits optimum control. It also requires a smaller area than a comparable conventional airport, needing about two-thirds the acreage for a typical installation. For instance, if an airport is designed to handle aircraft with an approach speed of 175 knots, the circular runway would have a radius of about 10,000 feet and a circumference of about 12 miles.



A. Main runway
B. High-speed turn-off
C. Taxi out for departure
D. Auto access (under runway and ramp)
E. Aircraft parking and loading ramp
F. Airport terminal building
G. Open park and gardens
H. Control tower and navigation aids

The circular runway concept with the airport building complex in the center would facilitate passenger access to and departure from aircraft. The design lends itself to an orderly flow of passenger traffic which would be by way of radial routes from the center hub. In addition, the new runway would allow large numbers of aircraft to hold short of it while awaiting departure. And, when wind is not a factor, simultaneous takeoffs and landings should be possible.

Testing, Analysis

RELIABILITY TEST METHODS OF MECHANICAL AND ELECTROMECHANICAL PARTS

(Order AD-621 074 Accelerated Reliability Test Methods for Mechanical and Electromechanical Parts, HC $6.00/MF $1.25.)

Accelerated reliability tests have been devised by Hughes Aircraft to reduce the time and expense usually associated with breakdown testing of mechanical and electromechanical parts. Hughes says that the switches, relays, mechanical seals, and timing belts used in the tests have an extremely long expected life span when used under the manufacturers' rated conditions. Early failure of the devices by stepped-up testing methods was therefore induced. The search for an accelerated reliability test method for each of the four parts included in the study was conducted by selecting a combination of operating and environmental stresses. These stresses were applied at higher than manufacturer's rated level of suggested operation. Parts were also tested at manufacturer's rated conditions to create data for comparison on parts from the same manufacturing lot. The Hughes study presents five mathematical models as possible representations of the failure laws operating when parts are operated at different levels of combined stresses. The five models are variations of time transformations on the cumulative failure distribution, the hazard rate, and the ratio of the hazard rate. Hughes point out that the validation as to which model best represents what happens in an accelerated test must, however, await further study.

Wood and Paper

RECENT WOOD-PLASTIC COMBINATIONS WORK

(Order NYO-3334-1 Research on Applications of Radiation-Induced Reactions in Gases, HC $3.00.)

Two processes have been developed by the Air Reduction Co. for the AEC on laboratory-scale production of wood-plastic composites by irradiation of wood impregnated with liquid vinyl chloride. One method performs the impregnation and irradiation at room temperature under pressure, while the other is completed at -78°C. The developers say the second method has the advantages of eliminating pressure vessel requirements and heat dissipation problems. It also results in the formation of a polymer of higher molecular weight. In comparison with untreated specimens, the wood-plastic composites exhibit improved appearance, machinability, dimensional stability, compressive and flexural strength, hardness, abrasion and chemical resistance, and fire resistance. The extent of improvement generally varies directly with the polymer concentration in the wood.

Management Control, Decision Systems

TRENDS IN ACCOUNTING

(Order AD-617 904 Some Developments in Management Science and Information Systems with Respect to Measurement in Accounting, HC $2.00/MF $0.50.)

Developments in management science and total information systems have brought about two trends in the field of accounting measurements, according to a report by the Carnegie Institute of Technology. One trend puts planning and control on a more "microscopic" level. As developments in managerial accounting have shifted the attention of accounting from the firm as a whole to subunits within the firm, the focus of the information system is now shifting attention from profit and cost centers to such things as individual machines, production lines, and inventory files. The second trend is the increasing attention given to interrelationships between the various units and functions which makeup the enterprise. The ability to take greater numbers of factors into account through the development of mathematical models not only facilitates planning in detail, it permits analysis of interdependencies between large organization units. Heretofore the importance of these interdependencies could only be surmised. The total systems approach has focused attention on the existence of interconnections. Computer technology has made the solving of large problems feasible. Finally, increased knowledge of the firm and its processes has resulted in detailed studies and reports that provide an overall view. That is, it is becoming feasible to determine the effect of a decision made by or for a subunit on all interrelated activities, rather than on just the unit itself.

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CURRENT research & development PROJECTS

01 AERONAUTICS

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CORNELL UNIVERSITY, SCHOOL OF ENGINEERING, AERONAUTICAL ENGIN, NEW YORK

HIGH SPEED AERODYNAMICS WITH REAL GAS EFFECTS

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AIR FORCE-OFFICE AEROSPACE RESEARCH

GAK 780 2 FIELD 20M,13+, 9C,20D

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INVESTIGATION OF A THREE-PHASE A.C. ARC HEATING TECHNIQUE FOR HYPERSONIC AERODYNAMIC SIMULATION

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EXPERIMENTAL INVESTIGATION OF THE EFFECT OF SOUND IMPINGEMENT UPON SHEAR FLOWS

E. MOLLOCHRISTENSE

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E. M. FRISBY

NR-211-083
11/64-10/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 786 1 FIELD 1C, 1B

RAVEN IND INC, , , SOUTH DAKOTA

SKYHOOK

J. R. SMITH, G. W. FENDRICH
F. HEIDELBAUER, D. JOHNSON, D. M. THON

NR-211-091
11/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2317 FIELD 4A

WINZEN RESEARCH INC, , , MINNESOTA

HIGH ALTITUDE BALLOONS

. NONE

NR-211-092
7/64- 6/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2357 FIELD 12A

UNIV OF CAL-BERKELEY, GRADUATE SCHOOL, MATHEMATICS, CALIFORNIA

NUMERICAL METHODS FOR BOUNDARY VALUE PROBLEMS

A. H. TAUB

NR-044-324
8/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2359 FIELD 20D

NEW YORK UNIVERSITY, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, NEW YORK

VISCOUS INTERACTION AT LOW REYNOLDS NUMBERS

A. FERRI

NR-061-153
8/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2369 FIELD 4A

WINZEN RESEARCH INC, , , MINNESOTA

HIGH ALTITUDE BALLOONS

. NONE

NR-211-092
8/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2422 FIELD 4A

SEA-SPACE SYSTEMS INC, PALOS VERDES ESTATES, , CALIFORNIA

HIGH ALTITUDE BALLOONS

A. D. STRUBLE

NR-211-094
10/64- 9/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2423 FIELD 4A

SEA-SPACE SYSTEMS INC, PALOS VERDES ESTATES, , CALIFORNIA

HIGH ALTITUDE BALLOONS

A. D. STRUBLE

NR-211-095
10/64- 9/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2469 FIELD 4A

WINZEN RESEARCH INC, , , MINNESOTA

HIGH ALTITUDE BALLOONS

. NONE

NR-211-092
11/64-10/65

NAVY-OFFICE OF NAVAL RESEARCH

03 ASTRONOMY AND ASTROPHYSICS

GH 236 3 FIELD 3A

NATL CTR ATMOSPH RES, BOULDER, , COLORADO

RESEARCH ON THE PHYSICS OF SOLAR FLARES + THE RELATIONSHIP OF SOLAR CORPUSCULAR EMISSIONS TO OPTICAL + RADIO FEATURES OF THE SUN

J. W. WARWICK

NASA-NSG-136-SI-2
4/65- 3/66

NASA

GH 325 3 FIELD 3A, 3B, 4A, 9+

UNIVERSITY NEW MEXICO, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, NEW MEXICO

INVESTIGATE RADAR ECHOES FROM THE MOON AND PLANETS, USING METHODS AND DATA FROM EARTH RADAR-RETURN STUDIES

A. H. ERTEZA

NASA-SI-3-NSG-129
1/64- 9/64

NASA

GH 327 3 FIELD 3A, 3B

NEW MEX STATE UNIV, GRADUATE SCHOOL, PHYSICS + CHEMISTRY, NEW MEXICO

PHOTOGRAPHIC PATROL AND STUDY OF THE PHYSICAL CONDITIONS ON THE MOON AND PLANETS

C. W. TOMBAUGH, J. C. ROBINSON
B. A. SMITH

NASA-SI-3-NSG-142
4/64- 3/65

NASA

GH 634 1 FIELD 3B, 9+

USOC, NATL BUR STAN, BOULDER, , COLORADO

SUPPORT OF PROJECT RESEARCH AT JICAMARCA RADAR OBSERVATORY, LIMA, PERU

K. L. BOWLES

NASA-P-1-R-83
2/64- 1/65

NASA

GH 1167 3 FIELD 3A, 3B, 7C, 7D

YALE UNIVERSITY, SCHOOL OF MEDICINE, INTERNAL MEDICINE, CONNECTICUT

797-565 O - 66 - 2

GH 1409 FIELD 3A, 8F

NEW YORK UNIVERSITY, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, NEW YORK

THEORETICAL AND EXPERIMENTAL RESEARCH IN GEOPHYSICS AND ASTROPHYSICS

L. ARNOLD

NASA-NSG-683-P-1
7/64- 6/65

NASA

GH 1520 FIELD 3A, 3B

WESTERN STATE COLLEGE, UNDERGRADUATE SCHOOL, , COLORADO

DEVELOP AND FLY A ROCKET SPECTROGRAPH TO EXAMINE IN CLOSE DETAIL THE SOLAR SPECTRAL EMISSION IN THE NEIGHBORHOOD OF THE LYMAN BETA L

T. VIULETT

NASA-NASR-213-SI-1
7/64-12/65

NASA

GNE 258 4 FIELD 3A, 3B

PRINCETON UNIVERSITY, GRADUATE SCHOOL, ASTROPHYSICAL SCIENCES, NEW JERSEY

SKYHOOK SOLAR ASTRONOMY

M. SCHWARZSCHILD

NR-013-201
11/64-10/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 1696 3 FIELD 3A, 3B

CORNELL UNIVERSITY, GRADUATE SCHOOL, ASTRONOMY + SPACE SCI, NEW YORK

SOLAR RADIO ASTRONOMY

T. GOLD

NR-370-321
8/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2284 FIELD 3A

LONDON UNIV OF, , , UNITED KINGDOM

COSMIC GAS CLOUD

D. MCNALLY

NR-046-808
7/64- 6/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2327 FIELD 3A

UNIV OF CAL-BERKELEY, GRADUATE SCHOOL, ASTRONOMY, CALIFORNIA

THE WATER VAPOR CONTENT OF COOL STELLAR ATMOSPHERES AND THE ATMOSPHERE OF MARS

H. SPINARD

NR-046-811
8/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2328 FIELD 3A, 3B,20J

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, ASTRONOMY + ASTROPHYS, ILLINOIS

SPECTRAL CLASSIFICATION AND SPECTROSCOPIC STUDIES

W. A. MILTNER

NR-046-813
8/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2329 FIELD 3A, 3B, 5A

UNIV OF ROCHESTER, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, NEW YORK

RESEARCH CONCERNING COMPOSITE PHOTOGRAPHY OF GALAXIES

S. SHARPLESS

NR-046-809
8/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2330 FIELD 3C, 3A

WESLEYAN UNIVERSITY, GRADUATE SCHOOL, ASTRONOMY, CONNECTICUT

MASSES AND ROTATION OF SOUTHERN GALAXIES

T. PAGE

NR-046-810
8/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2331 FIELD 3A

UNIV OF WISCONSIN, GRADUATE SCHOOL, ASTRONOMY, WISCONSIN

THE ENERGY DISTRIBUTION IN NOVA HERCULIS 1963

R. C. BLESS, T. E. HOUCK

NR-046-812
8/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2368 FIELD 3A, 5A

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, MATHEMATICS, TEXAS

HIGH ENERGY ASTRONOMY

E. L. SCHUCKING, E. *. SCHUCKING

NR-013-224
8/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2445 FIELD 3A, 3B

TEXAS TECHNOL COLLEGE, GRADUATE SCHOOL, CHEMISTRY, TEXAS

SPECTRAL STUDIES OF THE MATERIALS POSSIBLY PRESENT ON THE MARTIAN SURFACE

A. L. DRAPER, J. A. ADAMCIK

NR-046-814
11/64-10/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2465 FIELD 3A, 5A

UNIVERSITY OF COLORADO, GRADUATE SCHOOL, PHYSICS + ASTROPHYSICS, COLORADO

SOLAR ACTIVITY

D. E. BILLINGS

NR-013-215
11/64-10/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2467 FIELD 3A, 3B,20J

US, SMITHSONIAN INST, , , DIST OF COLUMBIA

FORMATION OF SPECTRA

C. A. WHITNEY

NR-014-114
11/64-10/65

NAVY-OFFICE OF NAVAL RESEARCH

04 ATMOSPHERIC SCIENCES

G8B 296 1 FIELD 4B

STANFORD RESEARCH INST, MENLO PARK, , CALIFORNIA

IDENTIFICATION OF CLEAR-AIR TURBULENCE AREA FROM WEATHER SATELLITE CLOUD PHOTOGRAPHS

S. M. SEREBRENY

WB-0296-64
7/63- 6/64

COMMERCE-WEATHER BUREAU

GH 73 2 FIELD 4A, 5A

GEORGIA INST OF TECH, GRADUATE SCHOOL, PHYSICS, GEORGIA

THEORETICAL AND EXPERIMENTAL STUDIES OF HIGH ALTITUDE CHEMICAL RELEASE

H. D. EDWARDS

NASA-NSG-304-SA-1
12/64-11/65

NASA

GH 687 1 FIELD 4A, 5A

UNIV OF NEW HAMPSHIRE, GRADUATE SCHOOL, PHYSICS, NEW HAMPSHIRE

MEASUREMENT OF NEUTRON INTENSITY IN SPACE

J. A. LOCKWOOD

NASA-NASR-164-SI-1
4/64- 6/65

NASA

GH 1301 1 FIELD 20C, 5A,18A

UNIV OF CAL-LA JOLLA, , , CALIFORNIA

THEORETICAL, ANALYTICAL AND EXPERIMENTAL STUDIES OF GEOMAGNETICALLY TRAPPED PARTICLES BY INTERPRETATION OF SATELLITE DATA

C. E. MCILWAIN

NASA-NSG-538-S-2
3/65- 3/66

NASA

GH 1471 4 FIELD 4A, 4B, 9+, 9A

USDC, NATL BUR STAN, BOULDER, , COLORADO

SUPPORT OF UNIV. OF HAWAII - UNIV. OF COLORADO RESEARCH ON ZODIACAL LIGHT AND AIRGLOW

F. E. ROACH

NASA-R-18-SI-3
2/65- 2/66

NASA

GH 1532 FIELD 3B, 4A, 5A

MASS INST OF TECHNOL, GRADUATE SCHOOL, PHYSICS, MASSACHUSETTS

PERFORM DESIGN STUDIES NECESSARY FOR ADAPTING EXPLORER XI GAMMA-RAY EXPERIMENT TO OAO SPACECRAFT

W. KRAUSHAAR

NASA-NSR-22-009-073
8/64- 8/64

NASA

GNE 2190 3 FIELD 4A, 5A

UNIVERSITY OF COLORADO, GRADUATE SCHOOL, PHYSICS + ASTROPHYSICS, COLORADO

HIGH ALTITUDE PHYSICS

G. NEWKIRK, W. O. ROBERTS

NR-013-204
7/64- 6/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2283 FIELD 4A

FLORIDA STATE UNIV, GRADUATE SCHOOL, METEOROLOGY, FLORIDA

ATMOSPHERIC DYNAMICS

R. PFEFFER

NR-082-216
7/64- 6/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2285 FIELD 5A

UNIVERSITY OF MICHIGAN, GRADUATE SCHOOL, PHYSICS, MICHIGAN

CLEAR AIR TURBULENCE

P. A. FRANKEN

NR-082-217
7/64-12/64

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2287 FIELD 4A

SPERRY RAND RCS CENTER, SUDBURY, , MASSACHUSETTS

ATMOSPHERIC PROBING

R. LHERMITTE

NR-082-215
7/64- 6/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2289 FIELD 4A, 5A

UNIV OF WESTERN ONT, GRADUATE SCHOOL, PHYSICS, CANADA

OPERATING SUPPORT FOR THE STORMERTRON

P. A. FORSYTH

NR-082-186
7/64- 6/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2312 FIELD 4A

US, NSF, , , DIST OF COLUMBIA

EQUATORIAL BALLOON EXPEDITION

R. FLEISCHER

NR-021-519
7/64- 6/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2367 FIELD 4A

NATL CTR FOR ATMOS RES, , , DIST OF COLUMBIA

EQUATORIAL BALLOON EXPEDITION

B. STILLER

NR-021-519
8/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2463 FIELD 4A

UNIV OF CAL-L. A., GRADUATE SCHOOL, METEOROLOGY, CALIFORNIA

ATMOSPHERIC TRANSMISSION

Z. SEKERA

NR-013-225
11/64-10/65

NAVY-OFFICE OF NAVAL RESEARCH

05 BEHAVIORAL AND SOCIAL SCIENCES

GH 970 1 FIELD 5A

IIT RESEARCH INSTITUTE, AT ILL INST OF TECHNOL, , ILLINOIS

EVALUATE TECHNOLOGICAL DEVELOPMENTS RESULTING FROM THE NATIONAL SPACE EFFORT

L. E. CONROY

NASA-NASR-65-03-E-6
10/64-10/65

NASA

GH 1044 1 FIELD 5A

NATL ACAD SCI NAT RE, , , DIST OF COLUMBIA

PARTIAL SUPPORT FOR THE PREVENTION OF DETERIORATION CENTER

C. J. WESSEL

NASA-NASR-182-E-4
5/65-12/65

NASA

GNE 42 4 FIELD 8C

NATL ACAD SCI NAT RE, , , DIST OF COLUMBIA

COMMITTEE ON OCEANOGRAPHY

E. F. COOK

NR-083-136
10/64- 9/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 676 1 FIELD 5A

ASPEN INST HUM STUDIES, ASPEN, , COLORADO

ASPEN PHYSICS INSTITUTE

R. MURRAY

NR-017-643
4/65- 3/66

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2395 4 FIELD 8F

NATL ACAD SCI NAT RE, , , DIST OF COLUMBIA

FOREIGN FIELD RESEARCH

E. B. ESPENSHADE

NR-389-105
8/64- 6/65

NAVY-OFFICE OF NAVAL RESEARCH

06 BIOLOGICAL AND MEDICAL SCIENCES

GF 2306 2 FIELD 7C,11G

PARK DAVIS AND CO DE, , , MICHIGAN

SYNTHESIS OF RADIATION PROTECTIVE CHEMICALS

J. R. DICE

DA-49-193-MD-2306
9/64- 8/65

ARMY-MED RES + DEVEL COMMAND

GFR 33 FIELD 7D,11C,11F

IIT RESEARCH INSTITUTE, AT ILL INST OF TECHNOL, , ILLINOIS

FLUORESCENT ANTIBODY STUDIES ON PATHOGENESIS + DIAGNOSIS OF ARBOVIRAL + RICKETTSIAL INFECTIONS

D. H. BOIES

/65- /

ARMY-MUNITIONS COMMAND

GH 1506 1 FIELD 22A, 3A, 3B

UNIV OF ROCHESTER, GRADUATE SCHOOL, BIOLOGY, NEW YORK

EXPERIMENTAL TECHNIQUES FOR REMOTE SAMPLING OF EXTRATERRESTRIAL LIFE, INCLUDING CONSTRUCTION OF A LABORATORY PROTOTYPE DEVICE

W. VISHNIAC

NASA-NSG-209-BS-1
12/64- 8/65

NASA

07 CHEMISTRY

GAK 210 3 FIELD 7C, 7D, 7B

UNIVERSITY OF COLORADO, GRADUATE SCHOOL, CHEMISTRY, COLORADO

COORDINATION CHEMISTRY OF THE GROUPS IV AND V METALS

R. N. KELLER

AF-33-657-8321
3/65- 2/66

AIR FORCE-OFFICE AEROSPACE RESEARCH

GAK 1542 1 FIELD 7C, 7D,20L

QUANTON, INC., WALLI, , , CONNECTICUT

SYNTHESES AND STUDY OF ELECTRICAL PROPERTIES OF NOVEL COMPOUNDS

P. LAFLAME

AF-19-628-2839
4/64- 3/65

AIR FORCE-OFFICE AEROSPACE RESEARCH

GAK 1789 1 FIELD 7C, 7D, 9+, 9C

NORTHEASTERN UNIV, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, MASSACHUSETTS

BIOLOGICAL, THERMAL AND QUANTUM PROCESSES RESEARCH

M. W. ESSIGMAN

AF-19-628-3836
10/64- 9/65

AIR FORCE-OFFICE AEROSPACE RESEARCH

GF 2590 1 FIELD 7C

REGIS CHEM. CO., CHI, , , ILLINOIS

ORGANIC CHEMICAL SYNTHESIS

W. F. GANNON

DA-49-193-MD-2590
5/65- 7/66

ARMY-MED RES + DEVEL COMMAND

GF 6514 FIELD 7C, 7A, 7D,20M

LONDON UNIV OF, , , UNITED KINGDOM

STUDY OF PHOTOCHEMICAL DECOMPOSITION OF METASTABLE SOLIDS

F. C. TOMPKINS

/64- /

ARMY-MED RES + DEVEL COMMAND

GH 564 1 FIELD 12A,20H,20J

UNIV OF KENTUCKY, GRADUATE SCHOOL, MATHEMATICS + ASTRON, KENTUCKY

INVESTIGATION AND RE-FORMULATION OF THE NUMERICAL ANALYSIS FOR SOLVING DIFFERENTIAL EQUATIONS OF STATE OF TWO ELECTRON ATOMS

W. S. KROGDAHL

NASA-NSG-393-P-3
6/64- 5/65

NASA

GH 1510 3 FIELD 7D

MASS INST OF TECHNOL, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

THE DETECTION AND IDENTIFICATION OF ORGANIC MATTER BY MASS SPECTROMETRY

K. BIEMANN

NASA-NSG-211-8F-1
12/64-11/65

NASA

GNE 218 3 FIELD 7C, 7D, 7A,20F

UNIV OF MASSACHUSETTS, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

POLYMER STRUCTURE

R. S. STEIN, D. KEEDY, M. B. RHODES

NR-056-378
11/64-10/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 425 1 FIELD 7C, 7A, 7D,20D

MASS INST OF TECHNOL, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, MASSACHUSETTS

POLYMER SOLUTION FLOWS

E. W. MERRILL, H. S. MICKLEY
E. MOLLOCHRISTENSE, H. SHIN, K. S. SMITH
P. VIRK

NR-062-333
12/64-11/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 1791 4 FIELD 20L, 7B

NORTHWESTERN UNIV, SCHOOL OF ENGINEERING, MATERIALS SCIENCE, ILLINOIS

TRANSPORT PROPS OF OXIDES

D. H. WHITMORE

NR-032-459
6/65- 5/66

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2073 3 FIELD 7D,20M, 7B

UNIV OF SOUTHERN CALIF, GRADUATE SCHOOL, CHEMISTRY, CALIFORNIA

BORON CHEMISTRY

A. B. BURG

NR-052-050
10/64- 9/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2323 4 FIELD 7B

OLIN MATHIESON CHEM CO, PALO ALTO, , CALIFORNIA

BORON COMPOUNDS

T. L. HEYING

NR-356-431
7/64- 6/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2421 FIELD 7A, 7D

RUTGERS THE STATE UNIV, GRADUATE SCHOOL, CHEMISTRY, NEW JERSEY

SORPTION OF GASES

M. J. LOW

NR-017-644
10/64-12/65

NAVY-OFFICE OF NAVAL RESEARCH

GPE 160 2 FIELD 7C, 7D,20J,20C

HEBREW UNIVERSITY IS, , , ISRAEL

ABSORPTION, LUMINESCENCE, ENERGY TRANSFER AND CONDUCTIVITY OF ORGANIC SYSTEMS UNDER EXCITATION IN THE VACUUM ULTRAVIOLET

A. WEINREB, U. LAUR, M. LEIBOWITZ
N. OHANA

AT-30-1-2949
3/64- 2/65

AEC-BIOLOGY + MEDICINE

08 EARTH SCIENCES AND OCEANOGRAPHY

GAK 1567 3 FIELD 3A, 4A,12A, 8E

UPSALA UNIVERSITY OF, , , SWEDEN

HIGH LATITUDE STUDIES

A. E. SANDSTROM

AF-61-052-614
5/64- 4/65

AIR FORCE-OFFICE AEROSPACE RESEARCH

GAK 1610 2 FIELD 13B,14B

PRINCETON UNIVERSITY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, NEW JERSEY

MACROMERITIC LIQUID THEORY OF SHEAR FAILURE

H. F. WINTERKORN

AF-19-628-2414
12/64-11/65

AIR FORCE-OFFICE AEROSPACE RESEARCH

GBM 3 FIELD 7D,21D, 8C

IIT RESEARCH INSTITUTE, AT ILL INST OF TECHNOL, , ILLINOIS

DETECTION OF OIL CONTAMINATION IN SEA WATER

M. J. SALKOWSKI

/66- /

COMMERCE-MARITIME ADMINISTRATION

GH 42 2 FIELD 3A, 8D, 8G, 7B

UNIV OF CAL-LA JOLLA, GRADUATE SCHOOL, OCEANOGRAPHY, CALIFORNIA

STUDY OF THE COMPOSITION AND STRUCTURE OF METEORITES, INCLUDING THE USE AND REFINEMENT OF X-RAY MICROSPECTROMETRIC AND MICRODIFFRAAA

G. O. ARRHENIUS, R. FITZGERALD, J. FRAZER
K. FREDRIKSSON, A. M. REID, J. SINKANKAS

NASA-NSG-317-SI-3
10/64- 9/65

NASA

GH 43 2 FIELD 7D, 8D

UNIV OF CAL-L. A., GRADUATE SCHOOL, GEOPHYS + PLANET PHYS, CALIFORNIA

ISOTOPIC CHEMISTRY OF METEORITES, INCLUDING STUDIES OF VARIATION IN ISOTOPIC ABUNDANCES AMONG DISCRETE SPECIMENS

G. W. WETHERILL, G. W. WETHERILL

NASA-NSG-313-SI-3
9/64- 8/65

NASA

GH 116 2 FIELD 3A, 8D, 8C

COLUMBIA UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, NEW YORK

QUANTITIES AND CONCENTRATIONS OF EXTRATERRESTRIAL MATTER THROUGH SAMPLINGS OF OCEAN BOTTOMS

W. A. CASSIDY

NASA-NSG-232-SI-3
10/64- 9/65

NASA

GH 432 2 FIELD 13B, 3A, 3B, 8F

MCGILL UNIV, GRADUATE SCHOOL, GEOGRAPHY, CANADA

IDENTIFYING GEOGRAPHICAL FEATURES FROM TIROS SATELLITE AND RECOVERED ROCKET CAPSULE PHOTOGRAPHS

J. B. BIRD

NASA-NASR-140-SA-1
11/64- 6/65

NASA

GH 1496 3 FIELD 4A

RAND CORPORATION, SANTA MONICA, 6O, OBS, CALIFORNIA

CONDUCT THEORETICAL STUDIES OF THE EARTHS MAGNETIC FIELD AND THE SPACE ENVIRONMENT NEAR EARTH

E. H. VESTINE

NASA-NASR-21-05-SI-2
7/64- 6/65

NASA

GNE 192 2 FIELD 8C

UNIV OF CAL-LA JOLLA, GRADUATE SCHOOL, OCEANOGRAPHY, CALIFORNIA

MARINE RADIOLOGICAL INSTRUMENTATION

T. R. FOLSOM

NR-089-003
11/64-10/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 239 2 FIELD 4A, 5A

UNIV OF BRITISH COL, GRADUATE SCHOOL, PHYSICS, CANADA

GEOMAGNETIC SIGNALS

J. A. JACOBS, T. WATANABE

NR-371-440
11/64-10/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 1740 5 FIELD 8F, 8C

COLUMBIA UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, NEW YORK

F&M GEOPHYSICS

M. EWING

NR-083-500
6/65-11/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2187 FIELD 13G, 8C

MASS INST OF TECHNOL, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, MASSACHUSETTS

EFFECTS OF BASIN GEOMETRY AND VISCOUS DAMPING ON THE AMPLITUDE OF RESONANT OSCILLATIONS IN HARBORS

A. T. IPPEN

/66- /

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2188 FIELD 13G, 8C

MASS INST OF TECHNOL, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, MASSACHUSETTS

INTERACTION OF WAVES WITH SUBMERGED AND FLOATING BODIES

A. T. IPPEN

/66- /

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2189 3 FIELD 8F

NATL ACAD SCI NAT RE, , , DIST OF COLUMBIA

ADVISORY COMMITTEE FOR GEOGRAPHY

E. B. ESPENSHADE

NR-389-008
8/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2282 FIELD 8C

BISSETT-BERMAN CORP, SAN DIEGO, , CALIFORNIA

OCEANOGRAPHIC BUOY SENSORS

D. CRETZLER

NR-083-195
7/64- 6/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2286 FIELD 8F

UNIV OF SOUTHERN CALIF, GRADUATE SCHOOL, GEOLOGY, CALIFORNIA

TWO YEAR STUDY OF THE COLORADO DELTA

D. S. GORSLINE

NR-388-079
7/64- 6/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2326 FIELD 8C

UNIVERSITY OF ALASKA, GRADUATE SCHOOL, INST OF MARINE SCIENCE, ALASKA

PHYSICAL OCEANOGRAPHY/R/ ACONA

K. M. RAE

NR-083-199
6/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2332 FIELD 8N, 4A,12A

UNIV OF WISCONSIN, GRADUATE SCHOOL, GEOLOGY, WISCONSIN

COMPUTER METHODS OF ANALYZING AEROMAGNETIC DATA

N. A. OSTENSO

NR-307-293
8/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2404 FIELD 8C, 5A

HARVARD UNIVERSITY, GRADUATE SCHOOL, METEOROL + OCEANOGRAPH, MASSACHUSETTS

OCEAN CIRCULATION MODELS

A. R. ROBINSON

NR-083-201
10/64- 9/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2405 FIELD 8K

COLUMBIA UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, NEW YORK

SEISMIC WAVE STUDIES

J. DORMAN, L. E. ALSOP

NR-081-256
10/64- 9/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2408 FIELD 20M, 8D, 8G

YALE UNIVERSITY, SCHOOL OF ENGINEERING, ENGINEERING + APPL SCI, CONNECTICUT

HIGH PRESSURE ROCK STUDIES

R. B. GORDON

NR-081-257
10/64- 9/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2442 FIELD 8F

HUGHES AIRCRAFT CO, CULVER CITY, , CALIFORNIA

GEOPHYSICAL EFFECTS STUDY

S. W. LICHTMAN

NR-087-141-8
11/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2458 FIELD 8C

COLUMBIA UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, NEW YORK

OCEAN SOUND TRANSMISSION

M. EWING

NR-186-202
11/64-10/65

NAVY-OFFICE OF NAVAL RESEARCH

GPE 268 6 FIELD 7D, 8D, 8G, 8C

UNIV OF CAL-LA JOLLA, GRADUATE SCHOOL, OCEANOGRAPHY, CALIFORNIA

MARINE GEOCHEMISTRY RESEARCH

E. D. GOLDBERG, R. BIERI, M. KOIDE

AT-11-1-34
10/64- 9/65

AEC-BIOLOGY + MEDICINE

09 ELECTRONICS AND ELECTRICAL ENGINEERING

GAK 1617 2 FIELD 9+, 9A,12A, 9C

CASE INST OF TECHNOL, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, OHIO

STUDY OF ANISOTROPIC MEDIA AND NETWORK SYNTHESIS

R. E. COLLIN

AF-19-628-1699
7/64- 6/65

AIR FORCE-OFFICE AEROSPACE RESEARCH

GFE 322 FIELD 13G,12A, 5C,13M

MASS INST OF TECHNOL, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, MASSACHUSETTS

COMPUTER SIMULATION OF THECOMPLETE TRANSIENT PROBLEM IN A HYDROPOWER PLANT

A. T. IPPEN, P. S. EAGLESON

/66- /

ARMY-CORPS OF ENGINEERS

GH 70 2 FIELD 12A

UNIV OF CONNECTICUT, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, CONNECTICUT

ANALYTICAL AND EXPERIMENTAL RESEARCH ON REDUCING THE SENSITIVITY OF CONTROL SYSTEMS TO PARAMETER VARIATIONS

D. P. LINDORFF, R. A. HIGGINBOTHAM T. M. TAYLOR

NASA-NSG-309-E-6
9/64- 8/65

NASA

GH 523 2 FIELD 1+,22+,12A

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, MATHEMATICS, MARYLAND

MULTIDISCIPLINARY RESEARCH ON THE APPLICATION OF HIGH SPEED COMPUTERS TO SPACE-RELATED RESEARCH PROBLEMS

W. C. RHEINBOLDT, . ROSENFELD

NASA-E-6-NSG-398
3/65- 2/66

NASA

GH 559 1 FIELD 3A, 3B

HARVARD UNIVERSITY, GRADUATE SCHOOL, ASTRONOMY, MASSACHUSETTS

A THEORETICAL STUDY OF METEORIC TRAJECTORIES AND PROCESSES

F. L. WHIPPLE

NASA-NSG-460-P-1
6/64- 5/65

NASA

GH 744 2 FIELD 9C, 9+,12A,22C

UNIV OF TENNESSEE, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, TENNESSEE

INVESTIGATIONS IN CONTROL SYSTEM THEORY TO STUDY DATA OPTIMIZATION WITH PARALLEL DATA-REDUCTION

J. C. HUNG, J. D. IRWIN, A. M. REVINGTON N. K. SINHA

NASA-NSG-351-C-6
5/65- 4/66

NASA

GNE 446 1 FIELD 9+

CHANCE VOAGHT AIRCRAFT, , , TEXAS

VOLUMETRIC 3-DIMENSIONAL DISPLAY

G. LANKFORD

NR-196-039
11/64- 1/65

NAVY-OFFICE OF NAVAL RESEARCH

10 ENERGY CONVERSION (NON-PROPULSIVE)

GH 443 2 FIELD 7D, 9C

UNIV OF PENNSYLVANIA, GRADUATE SCHOOL, CHEMISTRY, PENNSYLVANIA

STUDIES OF THE FUNDAMENTAL CHEMISTRY, PROPERTIES, AND BEHAVIOR OF FUEL CELLS

J. O. BOCKRIS

NASA-NSG-325-E-1
10/64- 9/65

NASA

GNE 55 2 FIELD 20M, 9+, 9A,11G

RCA, CAMDEN, , , NEW JERSEY

LOW WORK FUNCTION COLLECTOR MATERIALS

W. B. HALL

NR-099-373
8/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

11 MATERIALS

GAP 78 1 FIELD 7C, 7D,20J

UNIV OF MASSACHUSETTS, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

A STUDY OF DYNAMIC BIREFRINGENCE OF POLYMERIC SOLIDS

R. S. STEIN

AF-AFOSR-168-63
11/63-10/64

AIR FORCE-PHYSICAL SCIENCES

GH 161 3 FIELD 11F

UNIVERSITY OF MICHIGAN, SCHOOL OF ENGINEERING, CHEMICAL + METAL ENGIN, MICHIGAN

RESEARCH ON HEAT RESISTANT ALLOYS

J. W. FREEMAN

NASA-NSG-124-E-4
11/64-10/65

NASA

GH 488 2 FIELD 11F,11G, 5A

BROWN UNIVERSITY, GRADUATE SCHOOL, PHYSICS, RHODE ISLAND

THE DEGREE OF ORDER PRESENT ON REFRACTORY-METAL SINGLE CRYSTALS AS AFFECTED BY CHEMICAL ETCHES AND VARIOUS HEAT TREATMENTS

H. E. FARNSWORTH, J. E. BOGGIO C. A. HAQUE, H. L. PARK

NASA-NSG-373-SP-4
10/64- 9/65

NASA

GH 743 1 FIELD 7C, 7D

STANFORD RESEARCH INST, MENLO PARK, , CALIFORNIA

INVESTIGATION OF THE MECHANICAL PROPERTIES OF CROSS-LINKED POLYMETHYLMETHACRYLATE POLYMERS UNDER SIMULATED SPACE ENVIRONMENTAL CONDI

T. L. SMITH

NASA-NASR-49-13-P-2
10/64- 9/65

NASA

GH 806 2 FIELD 11B,11G

UNIV OF WASHINGTON, , , WASHINGTON

MULTIDISCIPLINARY RESEARCH ACTIVITY IN THE MATERIALS SCIENCES WITH EMPHASIS ON INVESTIGATIONS OF INORGANIC NON-METALLIC MATERIALS

T. S. SHELVIN

NASA-NSG-484-E-4
6/65- 5/66

NASA

GNE 240 4 FIELD 9+, 9A

UNIV OF SOUTHERN CALIF, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, CALIFORNIA

ARTIFICIAL DIELECTRICS

Z. KAPRIELIAN

NR-372-561
11/64-10/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 613 2 FIELD 7C,20M,20J, 7B

PENNSALT CHEM. CORP., , , PENNSYLVANIA

INORGANIC POLYMERS

W. M. LEE, B. P. BLOCK, W. H. CHAPPELL G. H. DAHL, J. P. KING, F. D. LOOMIS K. D. MAGUIRE

NR 356-408
7/64- 6/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 1707 3 FIELD 9C,11B,11G,11F

A O SMITH CORP MILWAUK, , , WISCONSIN

AMORPHOUS INORGANIC SOLIDS

J. H. HEALY

NR-017-446
3/64- 2/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 1816 3 FIELD 11D,11F,11G

FRANKLIN INSTITUTE, , , PENNSYLVANIA

THIN FOILS + COMPOSITES

H. G. WILSDORF

NR-031-667
12/64-11/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2414 FIELD 20F

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OPTICAL COATINGS

A. F. TURNER

NR-015-708
10/64- 9/65

NAVY-OFFICE OF NAVAL RESEARCH

12 MATHEMATICAL SCIENCES

GFX 272 FIELD 12A

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, MATHEMATICS, MARYLAND

PROBLEMS IN ALGEBRA

M. M. PEARL

DA-49-193-MD-65177
7/65- 6/66

ARMY-MEDICAL SERVICE

GNE 1672 3 FIELD 12A

PRINCETON UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW JERSEY

SMALL SAMPLE THEORY

J. W. TUKEY

NR-042-023
3/65- 2/66

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2303 FIELD 12A

STANFORD UNIVERSITY, GRADUATE SCHOOL, STATISTICS, CALIFORNIA

TIME SERIES ANALYSIS

E. PARZEN

NR-042-234
7/64- 6/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2304 FIELD 12A

STANFORD UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, CALIFORNIA

ANALYSIS OF FUNCTIONS

R. S. PHILLIPS, P. J. COHEN

NR-043-317
7/64- 6/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2305 FIELD 12A

UNIV OF CAL-L. A., , , CALIFORNIA

NON-LINEAR INTERACTIONS

. NONE

NR-015-812
7/64- 6/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2360 FIELD 12A

PRINCETON UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW JERSEY

ALGEBRAIC AND DIFFERENTIAL TOPOLOGY

J. W. MILNOR

NR-043-318
8/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

13 MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

GHD 857 FIELD 13F,13B, 5C

STATE, HIGHWAY DEPT.,, PHOENIX, , ARIZONA

RIGHT-OF-WAY LAND ECONOMICS STUDY

. NONE

CPR-ARIZ-A-10
/65- /

COMMERCE-BUREAU OF PUBLIC ROADS

GFX 273 FIELD 13B

JOHNS HOPKINS UNIV, SCHOOL OF ENGINEERING, SANITARY ENGINEERING, MARYLAND

ROLE OF DIFFUSION IN WASTE TREATMENT

C. E. RENN

DA-49-193-MD-56178
7/65- 6/66

ARMY-MEDICAL SERVICE

GNE 649 4 FIELD 11G,11H,20D,10B

FRANKLIN INSTITUTE, , , PENNSYLVANIA

GAS LUBRICATED BEARINGS

D. FULLER

NR-62-316
1/65-12/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 1169 2 FIELD 20D,10B

MITSUBISHI SHIPBUILD, ., , JAPAN

SUPERCAVITATING PROPELLERS

K. TANIGUCHI

NR-062-308
9/64- 8/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 1701 4 FIELD 11B,11G,20J,20C

GENERAL MILLS INC MI, , , MINNESOTA

SPUTTERING OF SOLIDS

G. WEHNER

NR-012-401
12/64-11/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2444 FIELD 13F,13B,13M,12A

NORTHWESTERN UNIV, GRADUATE SCHOOL, GEOGRAPHY, ILLINOIS

URBAN AND TRANSPORTATION INFORMATION SYSTEMS STUDIES

W. L. GARRISON

NR-389-143
11/64- 6/65

NAVY-OFFICE OF NAVAL RESEARCH

14 METHODS AND EQUIPMENT

GFX 216 FIELD 10B

BECKMAN INSTRUMENTS, FULLERTON, , CALIFORNIA

COMPRESSOR DEVELOPMENT PROGRAM CS-64-538

NONE

DA-49-193-MD-2781
7/65- 6/66

ARMY-MEDICAL SERVICE

GH 507 1 FIELD 5A,20D

UNIVERSITY OF ILLINOIS, GRADUATE SCHOOL, PHYSICS, ILLINOIS

THEORETICAL AND EXPERIMENTAL STUDIES OF THE UNDERLYING PROCESSES AND TECHNIQUES OF LOW PRESSURE MEASUREMENT

D. ALPERT

NASA-NSG-376-P-1
12/63-11/64

NASA

15 MILITARY SCIENCES

GNE 78 2 FIELD 19H

UNIVERSITY OF ILLINOIS, GRADUATE SCHOOL, CHEMISTRY + CHEM ENGIN, ILLINOIS

ASW EVALUATION ASSISTANCE

G. A. RUSSELL

NR-015-911
11/64-10/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2425 FIELD 13J,13F

NATL ACAD SCI NAT RE, , , DIST OF COLUMBIA

MARITIME CARGO STUDIES

E. G. FULLINWIDER

NR-347-009
10/64- 9/65

NAVY-OFFICE OF NAVAL RESEARCH

16 MISSILE TECHNOLOGY

GNE 145 1 FIELD 15G

ASTROPHYSICS RES CORP, LOS ANGELES, , CALIFORNIA

MISSILE LAUNCH PHASE

A. REIFMAN

NR-088-027
9/64- 8/65

NAVY-OFFICE OF NAVAL RESEARCH

17 NAVIGATION, COMMUNICATIONS DETECTION AND COUNTERMEASURES

GH 146 6 FIELD 9C, 9+,12A,22C

UNIVERSITY OF MICHIGAN, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, MICHIGAN

INVESTIGATIONS IN SPACE COMMUNICATIONS THEORY

F. J. BEUTLER

NASA-NSG-2-E-2
4/65- 3/66

NASA

18 NUCLEAR SCIENCE AND TECHNOLOGY

GAK 236 2 FIELD 8D, 8G,11B,18A

GENERAL ELECTRIC CO, SCHENECTADY, , NEW YORK

RESEARCH INTO RADIATION DAMAGE EFFECTS IN SOLIDS

R. M. WALKER

AF-19-628-369
4/64- 3/65

AIR FORCE-OFFICE AEROSPACE RESEARCH

GAK 1581 3 FIELD 7D,18A,20L, 7B

MASS INST OF TECHNOL, SCHOOL OF ENGINEERING, NUCL ENGIN + NUCL SCI, MASSACHUSETTS

RESEARCH IN REACTOR SPECTROMETRY, DOSIMETRY AND NEUTRON ACTIVATION ANALYSIS

T. J. THOMPSON

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5/65- 4/66

AIR FORCE-OFFICE AEROSPACE RESEARCH

GFX 135 FIELD 18A

EDGERTON G + G INC, SANTA BARBARA, , CALIFORNIA

PROGRAM ON THE STATE OF THE ART OF NUCLEAR RADIATION DOSIMETRY

J. HANDLOSER, K. C. HUMPHERYS, A. LUCAS · W. QUAM, J. SAYEG

DA-49-193-MD-2689
1/65- 1/66

ARMY-MEDICAL SERVICE

GNE 2402 FIELD 18A

CATHOLIC UNIV OF AMER, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, DIST OF COLUMBIA

ISOTOPIC NUCLEAR SOURCES

E. D. JORDAN

NR-087-156
10/64- 9/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2443 FIELD 8C,19H

IIT RESEARCH INSTITUTE, AT ILL INST OF TECHNOL, , ILLINOIS

EARLY DYNAMICS UW NUC EXP

C. A. KOT

NR-089-039
11/64-10/65

NAVY-OFFICE OF NAVAL RESEARCH

GPE 75 4 FIELD 7C, 7D,20J, 7B

UNIVERSITY NEW MEXICO, GRADUATE SCHOOL, CHEMISTRY, NEW MEXICO

THE SYNTHESIS AND PROPERTIES OF COMPOUNDS WHICH MAY BE USED AS SCINTILLATION SOLUTES IN LIQUID SCINTILLATORS

G. H. DAUB, F. N. HAYES, D. G. OTT

AT-29-2-915
9/63- 9/64

AEC-BIOLOGY + MEDICINE

GPE 75 5 FIELD 7C, 7D,20J

UNIVERSITY NEW MEXICO, GRADUATE SCHOOL, CHEMISTRY, NEW MEXICO

THE SYNTHESIS AND PROPERTIES OF COMPOUNDS WHICH MAY BE USED AS SCINTILLATION SOLUTES IN LIQUID SCINTILLATORS

G. H. DAUB, F. N. HAYES, D. G. OTT

AT-29-2-915
9/64- 9/65

AEC-BIOLOGY + MEDICINE

GPE 111 4 FIELD 11G, 5A

USN, OFF NAV RES, NAV RES LAB, , DIST OF COLUMBIA

APPLICATION OF LUMINESCENT SOLIDS TO

RADIATION DETECTION AND DOSIMETRY

F. H. ATTIX, E. W. CLAFFY, R. J. GINTHER S. G. GORDICS, A. E. NASH, J. H. SCHULMAN E. J. WEST

AT-49-7-1864
7/64- 6/65

AEC-BIOLOGY + MEDICINE

GPE 295 2 FIELD 7D,20M,20C, 5A

USDC, NATL BUR STAN, , , DIST OF COLUMBIA

GAMMA RAY ENERGY AND ABSORBED DOSE MEASUREMENTS BY CALORIMETRY

B. PETREE, J. C. HUMPHREYS

AT-49-2-1165
7/64- 6/65

AEC-BIOLOGY +.MEDICINE

20 PHYSICS

GAK 158 1 FIELD 20M,11F,11G, 5A

TUFTS UNIVERSITY, GRADUATE SCHOOL, PHYSICS, MASSACHUSETTS

INVESTIGATION OF ULTRASONIC ATTENUATION AND THERMAL CONDUCTIVITY OF IRRADIATED SOLIDS

K. A. MCCARTHY

AF-19-628-4029
10/64- 9/65

AIR FORCE-OFFICE AEROSPACE RESEARCH

GAK 658 1 FIELD 20D,10B,20J

GENERAL ELECTRIC CORP, PHILADELPHIA, , PENNSYLVANIA

DENSITY PROFILE MEASUREMENTS

P. GLOERSEN

AF-64-0263
6/64- 6/65

AIR FORCE-OFFICE AEROSPACE RESEARCH

GAK 709 2 FIELD 7D,20M,12A,20H

BRANDEIS UNIVERSITY, GRADUATE SCHOOL, PHYSICS, MASSACHUSETTS

TOPIC IN CLASSICAL AND QUANTUM MANY BODY THEORY

E. P. GROSS

AF-AFOSR-0176-63
11/64-10/65

AIR FORCE-OFFICE AEROSPACE RESEARCH

GAK 862 3 FIELD 20J,20C,18A, 7B

MELLON INST OF INDUS, , , PENNSYLVANIA

ELECTRONIC COLLISION CROSS SECTION

E. N. LASSETTRE

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11/64-10/65

AIR FORCE-OFFICE AEROSPACE RESEARCH

GAK 1019 1 FIELD 7C, 7D, 9A,11G

FLORIDA ATLANTIC UNIV, GRADUATE SCHOOL, PHYSICS, FLORIDA

PREPARATION, PHYSICAL MEASUREMENTS + CULLATION OF CRYSTAL STRUCTURE/PROPERTIES

R. PEPINSKY

AF-62-0046
8/64- 7/65

AIR FORCE-OFFICE AEROSPACE RESEARCH

GAK 1228 2 FIELD 11C,11F,11G

MARTIN CO BALTIMORE, , , MARYLAND

EFFECT OF SURFACES ON THE MECHANICAL BEHAVIOR OF METALS

I. R. KRAMER

AF-33-657-10509
10/64- 9/65

AIR FORCE-OFFICE AEROSPACE RESEARCH

GAK 1520 1 FIELD 7C, 7D, 9+, 9A

BROWN UNIVERSITY, GRADUATE SCHOOL, ENGINEERING, RHODE ISLAND

STUDIES OF RADIATION EFFECTS IN SEMICONDUCTORS

S. S. LOFERSKI

AF-33-657-8974
5/64- 4/65

AIR FORCE-OFFICE AEROSPACE RESEARCH

GAK 1637 2 FIELD 9+, 9A,11F,11G

GENERAL ELECTRIC CO, SCHENECTADY, , NEW YORK

RESEARCH ON CADMIUM TELLURIDE

W. W. TYLER

AF-33-615-8264
8/64- 7/65

AIR FORCE-OFFICE AEROSPACE RESEARCH

GAK 1663 2 FIELD 3A, 3B, 4A, 5A

UNIV OF NEW HAMPSHIRE, GRADUATE SCHOOL, PHYSICS, NEW HAMPSHIRE

INTENSITY-TIME VARIATIONS

J. A. LOCKWOOD

AF-19-628-2352
9/64- 8/65

AIR FORCE-OFFICE AEROSPACE RESEARCH

21 PROPULSION AND FUELS

GAK 1168 2 FIELD 21B, 7D,20M,20D

POLYTECH INST BROOKLYN, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, NEW YORK

HIGH FREQUENCY OSCILLATORY COMBUSTION

V. O. AGOSTA

AF-49-638-01263
10/63- 9/64

AIR FORCE-OFFICE AEROSPACE RESEARCH

GH 620 2 FIELD 22B,22A,17G,10B

UNIVERSITY OF ARIZONA, SCHOOL OF ENGINEERING, NUCLEAR ENGINEERING, ARIZONA

RESEARCH IN THE APPLICATION OF MODERN AUTOMATIC CONTROL THEORY TO NUCLEAR ROCKET DYNAMICS AND CONTROL

L. E. WEAVER

NASA-NSG-490-SP-3
7/65- 6/66

NASA

22 SPACE TECHNOLOGY

GH 7 3 FIELD 22+, 3A, 5A

GRAD RESEARCH CTR INC, DALLAS, , TEXAS

MULTIDISCIPLINARY RESEARCH IN SPACE RELATED SCIENCE AND TECHNOLOGY

L. V. BERKNER

NASA-NSG-269-M
4/65- 3/66

NASA

GH 566 1 FIELD 22D,22C, 4A, 5A

LEHIGH UNIVERSITY, GRADUATE SCHOOL, PHYSICS, PENNSYLVANIA

STUDY OF ATMOSPHERIC TURBULENCE AND ITS EFFECT ON A VEHICLE DURING LAUNCH

F. P. BEEK

NASA-NSG-466-SS-1
9/64- 8/65

NASA

GH 1056 1 FIELD 22B,17G,12A

UNIV OF TEXAS, AUSTIN, SCHOOL OF ENGINEERING, ENGINEERING MECHANICS, TEXAS

STUDY OF THEORY AND ANALYSIS OF LOW-THRUST GUIDANCE PROBLEMS IN DETERMINISTIC LINEAR CONTROL

B. D. TAPLEY

NASA-NSG-591-E-6
11/64- 5/65

NASA

GH 1429 FIELD 3B, 4A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

INVESTIGATE THE FEASIBILITY OF PERFORMING MULTISPECTRAL PHOTOGRAPHIC EXPERIMENTS ON MANNED ORBITING SPACECRAFT

J. F. CRONIN

NASA-R-22-013-012
7/64- 6/65

NASA

GH 1592 FIELD 7D,20M,11B,11G

OKLAHOMA STATE UNIV, GRADUATE SCHOOL, PHYSICS, OKLAHOMA

RESEARCH IN SPACE-RELATED SCIENCES AND ENGINEERING SURFACE PARAMETERS OF SOLIDS

E. E. KOHNKE, C. M. CUNNINGHAM

NASA-NSG-609-M
4/65- 3/66

NASA

GH 1593 FIELD 7A, 7D,20M,20D

OKLAHOMA STATE UNIV, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, OKLAHOMA

RESEARCH IN SPACE-RELATED SCIENCES AND ENGINEERING RESEARCH ON TRANSPORT PROPERTIES OF LIQUID MIXTURES

J. H. ERBAR

NASA-NSG-609-M
4/65- 3/66

NASA

TECHNICAL ABSTRACT BULLETIN

1/2. AERONAUTICS

AD-624 050 Fld. 1/2, 20/1
CFSTI Prices: HC $2.00 MF $0.50
SUPERSONIC TRANSPORT DEVELOPMENT FEDERAL AVIATION AGENCY WASHINGTON D C
SONIC BOOM RESEARCH AND DESIGN CONSIDERATIONS IN THE DEVELOPMENT OF A COMMERCIAL SUPERSONIC TRANSPORT (SST),
by Thomas H. Higgins. 3 Nov 65, 32p. Rept. no. SST-65-19

Unclassified report

Presented at the Meeting of the Acoustical Society of America (70th), St. Louis, Mo.

Descriptors: (*Sonic boom, Commercial planes), (*Supersonic planes, Transport planes), (*Transport planes, Supersonic planes), (*Commercial planes, Sonic boom), Airplane noise, Tolerances (Physiology), Reaction (Psychology), Public opinion, Structures, Damage, Scientific research, Oklahoma, New Mexico, Acoustics, Aeronautics

This paper presents a short history of sonic boom research and related operational considerations in the development of a commercial supersonic transport (SST). The most intensive public reaction research program to date was conducted at Oklahoma City, Oklahoma. An intensive research program to determine structural reaction to sonic booms was conducted at the White Sands Missile Range. These two programs are discussed and a brief summary of the findings of the programs is presented. The paper concludes that although much has been learned about the sonic boom phenomena through past flight and research activities, additional research and theoretical studies are warranted. (Author)

AD-624 119 Fld. 1/2
CFSTI Prices: HC $2.00 MF $0.50
ARMY AVIATION MATERIEL LABS FORT EUSTIS VA
UH-1D AIRCREW ARMORED SEAT: CRASH SURVIVAL ANALYSES.
Preliminary rept.,
by J. L. Reed, and H. W. Holland. Aug 65, 49p.
Rept. no. usaavlabs-TR-65-59
Proj. DA-1P121401A15003 Task 1P121401A1500301

Unclassified report

See also AD-608 192.

Descriptors: (*Helicopters, Crash injuries), (*Flight crews, Safety harness), (*Seats, Flight crews), Aviation personnel, Analysis

This report contains the results of preliminary crash survival analyses of a UH-1D helicopter aircrew armor seat. The data used in this study were developed from manufacturers' drawings, military specifications, and other sources. Further effort is required to determine the quantitative effects of the incorporation of an aircrew armor system into the existing UH-1D seat frame and restraint system. However, preliminary analyses and tests indicate that the new system, as configured, will contribute to a marginal crash survival condition for the aircrew occupants. Therefore, a program of redesign should be given serious consideration. (Author)

AD-623 866 **See Fld. 22/1**

1/3. AIRCRAFT

AD-624 045 Fld. 1/3
CFSTI Prices: HC $3.00 MF $0.75
SYSTEMS RESEARCH AND DEVELOPMENT SERVICE FEDERAL AVIATION AGENCY WASHINGTON D C
AN EVALUATION OF THE HEIGHT VELOCITY DIAGRAM OF A LIGHTWEIGHT, LOW ROTOR INERTIA, SINGLE ENGINE HELICOPTER.
Technical rept.,
by William J. Hanley, and Gilbert De Vore. Jul 65, 59p. Proj. FAA-540-006-01X FAA-ADS 46

Unclassified report

Descriptors: (*Helicopters, Flight testing), Helicopter rotors, Helicopter engines, Weight, Loading (Mechanics), Performance (Engineering), Velocity

A series of flight tests was conducted at three selected altitudes (sea level, 5000 feet, 7000 feet) to determine the effects of altitude and weight on the height-velocity (H-V) diagram of a small, lightweight, low rotor inertia, medium disk loading, single rotor, single engine helicopter. Two gross weights of the helicopter were used. Quantitative and qualitative test data were collected to determine how the H-V diagram varies with density altitude and aircraft gross weight. An investigation was made into the effects on the diagram of a delayed collective pitch application response. Results disclosed a family of curves showing that increases in density altitude and/or gross weight enlarged the H-V diagram required for a safe power-off landing. Analysis of the results revealed that the key points (V sub cr, h sub min, and h sub max), which partially define the curves, could be determined by the solution of a set of linear equations. These results were identical to those reported in FAA Technical Report ADS-1 except for the constants of the linear equations and the location of the critical height. The critical height indicated a slight increase as weight, altitude and collective pitch reduction time delay were increased. An average value for the critical height can be selected without upsetting the family of curves. (Author)

AD-624 046 Fld. 1/3, 14/2
CFSTI Prices: HC $4.00 MF $1.00
AVIATION SAFETY ENGINEERING AND RESEARCH PHOENIX ARIZ
PASSENGER/CREW TEST LOAD SIMULATION CRITERIA.
Technical rept.,
by D. F. Carroll, and H. G. C. Henneberger. Jun 64, 136p. Contract FA-WA-4459 FAA ADS 20

Unclassified report

Descriptors: (*Aircraft seats, Loading (Mechanics)), (*Anatomical models, Standards), Pilots, Personnel, Measurement, Weight, Data, Simulation, Graphics, Abstracts, Test equipment, Test methods, Bibliographies

Criteria a may be required in the future for appropriate body blocks, anthropomorphic dummies, and instrumentation for use in static and dynamic testing of civil aircraft seat systems in provided. Anthropomorphic data on airline travelers and flight crews is given along with specific recommendations for standard human body load simulators and minimum instrumentation requirements. (Author)

AD-624 051 Fld. 1/3
CFSTI Prices: HC $4.00 MF $0.75
AVIATION SAFETY ENGINEERING AND RESEARCH PHOENIX ARIZ
FULL-SCALE DYNAMIC CRASH TEST OF A DOUGLAS DC-7 AIRCRAFT.
Final technical rept.,
by W. H. Reed, S. H. Robertson, L. W. T. Weinbergand , and L. H. Tyndall. Apr 65, 108p. Contract FA-WA-4569 FAA-ADS 37

Unclassified report

Descriptors: (*Transport planes, Aviation accidents), (*Aviation accidents, Tests), Impact shock, Damage assessment, Aviation safety, Test methods, Fuel tanks, Damage, Pilot seats, Aircraft seats, Airframes

The purpose of the test presented in this report was to obtain crash environmental data to study fuel containment and to collect data on the behavior of various components and equipment aboard the aircraft using a DC-7 as the test vehicle. The aircraft was accelerated under its own power by remote control along a monorail nose landing gear guidance system for a distance of 4000 feet, reaching a velocity of 139 knots. At the end of this acceleration run, the aircraft impacted against special designed barriers which removed the landing gear, permitting the aircraft to become airborne until impact with wing and fuselage barriers. (Author)

AD-624 145 Fld. 1/3, 21/5
CFSTI Prices: HC $4.00 MF $1.00
KAMAN AIRCRAFT CORP BLOOMFIELD CONN
A MAIN POWER SYSTEM FOR SHAFT-DRIVEN HEAVY LIFT HELICOPTERS.
Final rept.,
by Robert B. Bossler Jr.. Oct 65, 119p. Rept. no. kaman-R-555
Contract DA-44-177-AMC-212 (T) Proj. DA-1M121401D14414 USAAVLABS TR-65-52

Unclassified report

Descriptors: (*Helicopter engines, Design), (*Helicopters, Power), (*Turbines, Helicopters), Helicopter rotors, Transmissions, Shafts

Multiple gas generators, installed in a conventional horizontal position, are all gas-coupled to the same peripherally-driven remote turbine of the lift and cruise fan type. The remote turbine is mounted co-axially to a speed-reducing gearbox which is also coaxial with the rotor. The concept is known as the Turbine Integrated Geared Rotor 'TIGR'. The TIGR arrangement eliminates from transmission design the functions of engine combining,

797-128 O-66—1

at lower culmination is only 8.5 degrees. The theoretical investigations have mainly been concerned with the case when the irregular region is thin; thus only producing an irregular variation of the phase of the emerging wave front. In this paper the more general case of an irregular region of arbitrary thickness is considered.

AD-623 803 Fld. 3/2, 20/9
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
MIXING LENGTH DAMPING AND SUNSPOTS,
by Paul S. Lykoudis. Nov 65, 18p. Rept. no. p-3249
Unclassified report

Descriptors: (*Sunspots, Magnetohydrodynamics), (*Magnetohydrodynamics, Sunspots), (*Astrophysics, Sunspots), Solar atmosphere, Magnetic fields, Thermodynamics, Theory

An evaluation is made of the sunspot problem from the point of view of small magnetic Reynolds numbers allowing for slippage between the flow and the magnetic field. The evaluation is based on recently available laboratory experiments with liquid metal, which are predictable with a theory allowing for the damping of the turbulence, and therefore of the mixing length as a function of the magnetic field.

AD-623 871 Fld. 3/2, 20/6
CFSTI Prices: HC $2.00 MF $0.50
MANCHESTER UNIV (ENGLAND) DEPT OF ASTRONOMY
SPECTROPHOTOMETRIC STUDY OF THE LUNAR SURFACE.
Final scientific rept.,
by Zdenek Kopal. Jul 65, 27p. Contract AF61 (052)-378 ,AF61 (052)-400 AFCRL 65-77
Unclassified report

Descriptors: (*Moon, Luminescence), (*Luminescence, Moon), (*Astrophysics, Moon), (*Spectrophotometers, Astrophysics), Solar distrubances, Lunar environment, Optical analysis

The report gives an account of the instrumentation (photoelectric spectrometers) built for the study of the luminescence of the lunar surface, as well as of the observations carried out with their aid. The existence of a transient luminescence has repeatedly been detected photoelectrically by the 'line-depth' method, as well as photographically by use of narrow-passband interference filters in different parts of the lunar surface. The present report gives a summarizing account of such observations. It is pointed out that luminescence is connected with the solar activity, and induced probably by the corpuscular output of solar flares. (Author)

AD-623 872 Fld. 3/2
CFSTI Prices: HC $2.00 MF $0.50
LIEGE UNIV COINTE-SCLESSIN (BELGIUM) INSTITUT D'ASTROPHYSIQUE
MG I LINES IN THE SOLAR SPECTRUM.
Technical note,
by J. W. Swensson, and G. Risberg. 31 Aug 65, 49p. Rept. no. tn-2
Contract AF61 (052)-685 AFCRL 65-82
Unclassified report

Descriptors: (*Solar spectrum, Magnesium), (*Magnesium, Line spectrum), Solar radiation, Absorption spectrum, Tables, Belgium

Some of the results of a recent laboratory investigation of the spectrum of magnesium are presented in the form of a multiplet table giving wavelengths, intensities, excitation potentials, and line classifications for Mg I. Numerous predicted lines are also included in this table. On the basis of these data a search for magnesium lines in the solar spectrum has been carried out. It was found that 219 features in this spectrum can be attributed with certainty either wholly or partly to Mg I; 91 of these identifications are new. Certain line series are observed to higher nvalues in the solar spectrum than in the laboratory. A determination of the mean wavelength displacements for the unblended Mg I lines in the Fraunhofer spectrum yields values ranging from +0.007 A for the wavelength region 3093-6319 in the Revised Rowland Table to +0.12 A for the 12084-24566 wavelength interval described in Mohler's table of solar spectrum wavelengths. The line shifts can not be explained solely in terms of a Doppler- or an Einstein shift. (Author)

AD-623 915 Fld. 3/2
CFSTI Prices: HC $3.00 MF $0.50
PRINCETON UNIV N J DEPT OF ASTRONOMY
INVESTIGATIONS OF PROBLEMS OF STAR FORMATION.
Final rept.,
by Bengt Stromgren. 12 Nov 65, 54p. Contract Nonr-1858 (33)
Unclassified report

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Stars, Spectroscopy), Astrophysics, Optical analysis, Photometers, Astronomical data, Tables

The research work is concerned with the determination, for F and G stars, of color and absolute magnitude, distance from the galactic plane, space velocity, age, and an index of atmospheric metal content. The instrumentation used for photoelectric photometry is described. A catalogue of 1217 stars brighter than V !6.5 (M), mostly of spectral classes A, F and G, is also included.

AD-623 925 Fld. 3/2, 4/1, 20/3
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS UPPER ATMOSPHERE PHYSICS LAB
SPACE ELECTRICITY: PHYSICAL PROBLEMS AND EXPERIMENTAL TECHNIQUES.
Physical sciences research papers,
by R. C. Sagalyn. Sep 65, 29p. Rept. no. psrp-140
Proj. AF-8617 Task 861701 ,861702
AFCRL 65-70
Unclassified report

Availability: Published in Problems of Atmospheric and Space Electricity NP 1965. Copies to DDC users only.

Descriptors: (*Space environmental conditions, Electricity), (*Atmospheric electricity, Periodic variations), Interstellar matter, Upper atmosphere, Electron density, Plasma medium, Solar radiation, Space probes

Intensive experimental and theoretical investigations of the physics of the upper atmosphere and interplanetary gas are underway. The ultimate understanding of many problems in space physics depends upon the accurate measurement of the fundamental properties of these regions including charged particle densities, composition and temperature; solar flux over the wavelength regions capable of dissociating, exciting or ionizing atmospheric species; magnetic and electric fields; and the direction, flux and energy distribution of interplanetary charged particles. The measurements must be carried out in space and time and include both quiet and disturbed solar periods. Some of the important physical processes influencing the spatial and temperal variations of charged particles, ions, electrons and protons in the upper atmosphere and interplanetary gas are outlined. Uncertainties that presently exist in the explanation of these phenomena are discussed. Techniques which have been used to study the properties of charged particles with instruments placed on rockets, satellites and deep space probes are described. Some of the difficulties encountered in trying to make accurate measurements with instruments mounted on vehicles moving at great velocities in a highly variable plasma are discussed. (Author)

AD-623 939 Fld. 3/2
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS SPACE PHYSICS LAB
OBSERVATIONAL STUDY OF MACROSCOPIC INHOMOGENEITIES IN THE SOLAR ATMOSPHERE. VI. PHOTOSPHERIC OSCILLATIONS AND CHROMOSPHERIC STRUCTURE.
Environmental research papers,
by Frank Q. Orrall. Aug 65, 17p. Rept. no. erp-130
Proj. AF-7649 Task 764906
AFCRL 65-63
Unclassified report

Availability: Published in Astrophysical Journal V141 N3 P1131-8, 1 Apr 65. Copies to DDC users only.

Descriptors: (*Solar atmosphere, Spectroscopy), (*Astrophysics, Solar atmosphere), Chromosphere, Solar corona, Oscillation

A time-series analysis has been made of fifty carefully guided spectrograms of a quiet region at the center of the Sun's disk. The periods and amplitudes of the vertical oscillatory portion of the photospheric velocity field (as indicated by displacements of the line lambda 3931.122Fe I) have been determined for 280 places on the disk. The intensity of the K2 (CaII) chromosphere overlying each of these places was measured on the same spectrograms. A detailed statistical analysis shows no evidence of a difference between the velocity amplitudes underlying weak plages or the chromospheric network, and regions free of calcium flocculi. There is a slight indication (probably not significant) that the periods are a little longer in photospheric regions that underlie the network. Evidently the relatively weak magnetic fields found in quiet regions have no important influence on the photospheric oscillations. The average periods and amplitudes were found to be 300=54 sec and 0.247 =0. 052 km/sec, respectively. No evidence was found for a relation between period and velocity amplitude. (Author)

AD-624 047 Fld. 3/2
CFSTI Prices: HC $6.00 MF $1.25
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH MATHEMATICS RESEARCH LAB
INTERNAL STRUCTURE OF THE MOON,
by Zdenek Kopal. Sep 65, 218p. Rept. no. d1-82-0466 ,Mathematical note-426
Unclassified report

Also available from the author.

Descriptors: (*Moon, Structural properties), Hydrostatics, Thermal properties, Surface temperatures, Thermal stresses, Stresses, Convection (Heat transfer), Chemical properties, Exosphere

The internal structure of the moon and its evolution are discussed. Some topics considered are: hydrostatic equilibrium; thermal history of the moon; stress history of the moon; possible convection in lunar interior; chemical composition of the moon; lunar exosphere.

AD-624 049 Fld. 3/2, 20/9
CFSTI Prices: HC $1.00 MF $0.50
SACRAMENTO PEAK OBSERVATORY SUNSPOT N MEX
A STUDY OF HYDROGEN EXCITATION AND IONIZATION IN SOLAR PROMINENCES.
Solar research note,
by Y. Shi-Huei. 1965, 20p. Rept. no. srn-T-21
TT 65-64585
Unclassified report

Trans. of Akademiya Nauk SSSR. Krymskaya Astrofizicheskaya Observatoriya. Izvestiya, v25

change of direction, part of the required speed reduction from conventional engine speed to rotor speed, misalignment couplings and all of the multiple individualengine overrunning-clutch provisions required for engineout operation and for autorotation. A three-phase program of design, analysis, and comparative evaluation of TIGR, including the effect on adjacent systems and the resulting Heavy Lift Helicopter (HLH) aircraft, is presented. The results show TIGR has a 280 percent improvement in mean time between mission-abort failure over conventional multiple engine/transmission practice for the entire HLH power train from the engine inlets to the rotor hub. Cost per HLH flight hour is reduced, and the high fuel efficiency of mechanically-driven rotors is retained. TIGR is believed to be eminently practical and is ready for dynamic testing. (Author)

AD-623 797 See Fld. 17/5

AD-623 962 See Fld. 6/6

1/5. AIR FACILITIES

AD-623 817 Fld. 1/5
CFSTI Prices: HC $1.00 MF $0.50
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J
EVALUATION OF RUNWAY IMPRESSION FENCES.
Final rept.,
by Donald J. Bourque. Jun 65, 22p. Proj. FAA-430-004-01V SRDS RD-65-85

Unclassified report

Descriptors: (*Runways, Landing aids), (*Landing aids, Runways), Safety devices, Terminal flight facilities, Airports, Approach indicators, Effectiveness, Damage, Civil aviation, Air Defense Command, Statistical analysis

The runway impression fence was developed by the Air Defense Command of the United States Air Force as a safety device to minimize landings in the undershoot area. The Federal Aviation Agency conducted operational evaluations at Houston International Airport, Houston, Texas, and at Bradley Field, Windsor-Locks, Connecticut, to determine the effectiveness and suitability of the runway impression fence for reducing the likelihood of undershoots at civil airports. Aircraft crossing heights at threshold were measured before and after the installation of runway impression fences. Statistical comparisons of these data were made to determine the effectiveness of the fence. Data were also collected on damage to various fence post designs. It was concluded that runway impression fences are effective in reducing the likelihood of undershoots at civil airports during daylight and not significantly effective at night. It was recommended that runway impression fences be considered as a means of reducing the number of undershoots at runways where short landings would be unsafe and that the final fabrication and installation procedures used at Bradley Field be employed until a superior design is developed through further study and field testing. (Author)

AD-623 953 Fld. 1/5, 13/6
CFSTI Prices: HC $3.00 MF $0.75
BOEING CO MORTON PA VERTOL DIV
FEASIBILITY STUDY OF ON-SITE FABRICATED HELICOPTER PADS.
Rept. for May-Sep 65.
Nov 65, 79p. Rept. no. d6-57117
Contract NOm-72358

Unclassified report

Descriptors: (*Landing mats, Heliports), (*Helicopters, Landing mats), (*Soils, Binders), Polyester plastics, Isocyanate plastics, Epoxy plastics, Glass textiles, Roadbuilding equipment, Feasibility studies

The on-site fabrication of helicopter pads using plastic resins and other lightweight materials was investigated. It was assumed that rapid curing materials could be sprayed or poured over soil, resulting in a surfacing of sufficient strength to allow the operation of helicopters on low California Bearing Ratio (CBR) soils. Materials were sought which had desirable characteristics such as rapid curing under wide temperature and moisture conditions, low cost, low toxicity, high strength-to-weight ratio, easy application, and extended storage life. Forty-three materials were evaluated. Materials which did not cure within a prescribed 3-hour limit were eliminated from further structural testing. Twenty materials were subjected to small-scale structural testing. Of these materials, three polyester resins, one epoxy resin, and one polyurethane foam exhibited the highest strength characteristics. Static wheel-load tests of 14,000 pounds and 80 psi tire pressure were performed, simulating the CH-37C marine helicopter wheel loading. (a) All polyester reinforced with 17 to 35 percent chopped fiberglass withstood the 14,000 pound wheel load. (b) One epoxy specimen reinforced with 32 percent chopped fiberglass withstood a 14,000 pound wheel load. (c) One polyurethane foam specimen with an 18 pound per cubic foot density and an average thickness of 1 inch failed at a 3700 pound wheel loading.

AD-623 997 See Fld. 13/2

2/2. AGRICULTURAL ECONOMICS

AD-624 205 See Fld. 7/3

2/4. AGRONOMY AND HORTICULTURE

AD-624 004 Fld. 2/4, 8/13, 13/2
CFSTI Prices: HC $4.00 MF $1.00
PURDUE UNIV LAFAYETTE IND DEPT OF AGRONOMY
THE ESTABLISHMENT AND MAINTENANCE OF TURF ON STABILIZED GRANULAR MATERIAL.
Final rept.
Aug 49, 162p. Contract W-33-017-eng-3729 ,W-33-017-eng-3780

Unclassified report

Also PB-108 830, available from Ohio Div. Labs., Mariemont, Ohio, $4.00.

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Grasses, Growth), (*Soil mechanics, Grasses), Limestone, Gravel, Growth substances, Fertilizers, Plants (Botany), Soils, Stabilization, Civil engineering

A study was made of a number of factors involved in establishing turf on stabilized limestone granular materials. Fertility, grass species, root penetration, pH, varying binder soil content, and effect of turf on stability were the factors studied in the greenhouse and in the field. It was shown that with ample fertility, turf can be grown on aggregate with as little as 4.5% binder soil. The yield of grass increased with each added increment of soil above 4.5%, but satisfactory turf was maintained on aggregates with as little as 7.0 to 10.5% binder soil. The pH of the gravel and limestone aggregates used in the study was between 8.0 and 8.5. An application of 3000 lbs. of sulfur per acre lowered the pH by 0.5 pH unit for one year on gravel aggregate. Alta fescue was shown to appear very promising for use on stabilized granular materials. Its fast growth habits and its ability to persist under conditions of low fertility made it appear desirable for such purposes. Kentucky bluegrass and Chewings fescue also made satisfactory growth on this material, but their finer qualities and slower growth habits put them second choice to Alta fescue. Indications were that they are not as wear resistant as Alta.

2/6. FORESTRY

AD-624 112 See Fld. 14/5

3/1. ASTRONOMY

AD-624 063 Fld. 3/1
DEARBORN OBSERVATORY NORTHWESTERN UNIV EVANSTON ILL
PHOTOGRAPHIC MEASURES OF DOUBLE STARS,
by K. Aa. Strand. 1957, 36p. Contract Nonr-1711 (00) Grant ,NSF-G483 Proj. NR-046-745

Unclassified report

Availability: Published in Annals of the Dearborn Observatory of Northwestern University V7 PT2 P31-65 1957. Copies to DDC users only.

Descriptors: (*Binary stars, Photographic analysis), Celestial mechanics, Astronomical data, Tables, Stars, Catalogs

The total weight of the results collected in the present paper as obtained from the internal mean errors of the plates is 23,983,000 inches to the minus 2nd power with approximately equal weight for each coordinate. Assuming a mean error of 0 in.09 for an ordinary visual observation of a binary star with the micrometer, the above equals approximately the weight of 100,000 visual measures. A total of 176 stars appears in the catalogue. Altogether 904 plates were measured with a total of 947 plate measures. The total number of single settings equals 578,637. (Author)

3/2. ASTROPHYSICS

AD-623 732 Fld. 3/2, 14/2
CFSTI Prices: HC $1.00 MF $0.50
PRINCETON UNIV N J OBSERVATORY
BALLOON PROJECT.
Progress rept. for Nov 64-Apr 65,
by Martin Schwarzschild. Apr 65, 6p. Contract Nonr-1858 (03) Grant ,NSF-G5464

Unclassified report

See also AD-610 626.

Descriptors: (*Astrophysics, Scientific research), (*Balloons, Astrophysics), (*Tracking telescopes, Infrared equipment), (*Infrared telescopes, Airborne), Instrumentation, Cosmic rays, Photomultipliers, Cooling, Mirrors, Optical equipment, Flight testing

AD-623 753 Fld. 3/2, 20/14
CHALMERS UNIV OF TECHNOLOGY GOTEBORG (SWEDEN) RESEARCH LAB OF ELECTRONICS
SCINTILLATION OF DISCRETE RADIO SOURCES.
by Torleiv AA. Orhaug. 1965, 118p. AFCRL 65-50

Unclassified report

Availability: Published in Transactions of Chalmers Univ. of Technology No. 299, 1965, Swedish Kr. 25.00. Copies to DDC users only.

Descriptors: (*Extraterrestrial radio waves, Scintillation), (*Scintillation, Extraterrestrial radio waves), (*Radio astronomy, Stars), Very high frequency, Radio waves, Ionospheric disturbances, Magnetic storms, Radiofrequency interference, Phase shift, Astrophysics, Geophysics

This paper deals with the theory of scintillation of discrete radio sources and results of scintillation observations made simultaneously at two frequencies. The discrete radio source Cygnus A was chosen for this study because its angle of elevation p234-48 1961.

Descriptors: (*Hydrogen, Solar atmosphere), (*Solar atmosphere, Hydrogen), (*Plasma physics, Solar atmosphere), Excitation, Ionization, Electron transitions, Recombination reactions, Gas ionization, Solar spectrum, Solar corona, Astrophysics, USSR

The mechanisms of hydrogen excitation and ionization are discussed on the basis of known results. Expressions for 7 atomic processes which determine the population of hydrogen atoms are discussed. These expressions contain a number of unknown quantities which are determined by solving the system of stability equations. This allows for the calculation of the numbers of all the atomic processes. A comparison of their values leads to the conclusions: (1) the hydrogen excitation in prominences is determined mainly by their proper radiation, (2) for the high levels hydrogen ionization is caused by electron collisions, for low levels photoionization plays a more important role. (Author)

AD-624 076 Fld. 3/2
CFSTI Prices: HC $2.00 MF $0.50
SACRAMENTO PEAK OBSERVATORY SUNSPOT N MEX
NONSTATIONARY PROCESSES IN SOLAR MAGNETIC FIELDS. THE GENERATION OF FLARES AND HEATING OF FACULAE.
Solar research note,
by A. B. Severny. 1965, 45p. Rept. no. srn-T-18
TT 65-64586
Unclassified report

Trans. of Akademiya Nauk SSSR. Krymskaya Astrofizicheskaya Observatoriya. Izvestiya, v27 p71-108 1962.

Descriptors: (*Solar flares, Magnetic fields), (*Solar Spectrum, Hydrogen), (*Solar atmosphere, Heating), Sunspots, Magnetic pinch, Polarization, Emissivity, Solar radiation, Line spectrum, Plasma physics, Magnetohydrodynamics, Astrophysics, USSR

The considerations of non-stationary processes originating in the sun's magnetic fields (flares, faculae) are considered in detail. This work is a continuation of the investigation of magnetic fields connected with flares carried out in 1958 which led to the representation of solar flares as a sort of pinch-effect originating in the neutral points of the crossed magnetic fields when the field gradient is increasing. Since that time however a considerable amount of new experimental data appeared which, on one hand, confirmed the important role of the changes in magnetic fields for the generation of flares but on the other, however, demanded a more precise picture of the process and the introduction of substantial corrections. The present work is dedicated to this precision and alteration of the primary picture of the sun's flare generation. In addition, the slow processes of heating and compression of solar plasma are considered, for apparently they are significant for explanation of the solar faculae. (Author)

AD-624 083 Fld. 3/2, 20/9
CFSTI Prices: HC $1.00 MF $0.50
SACRAMENTO PEAK OBSERVATORY SUNSPOT N MEX
DYNAMICS OF LIMB FLARES AND THE PINCHEFFECT.
Solar research note,
by A. B. Severny, and E. F. Shaposhnikova.
1965, 22p. Rept. no. SRN-T-19
TT 65-64587
Unclassified report

Trans. of Akademiya Nauk SSSR. Krymskaya Astrofizicheskaya Observatoriya. Izvestiya, v24 p235-57 1960.

Descriptors: (*Solar flares, Magnetic pinch), Solar spectrum, Solar disturbances, Plasma physics, Astrophysics, USSR

AD-624 084 Fld. 3/2
CFSTI Prices: HC $3.00 MF $0.50
SACRAMENTO PEAK OBSERVATORY SUNSPOT N MEX
A SPECTROPHOTOMETRIC STUDY OF SOLAR PROMINENCES.
Solar research note,
by Y. Shih-Huei. 1965, 57p. Rept. no. SRN-T-22
TT 65-64588
Unclassified report

Trans. of Akademiya Nauk SSSR. Krymskaya Astrofizicheskaya Observatoriya. Izvestiya, v25 p180-233 1961.

Descriptors: (*Solar flares, Spectroscopy), Solar disturbances, Solar spectrum, Spectrophotometers, Astrophysics, USSR

AD-624 180 Fld. 3/2
PRINCETON UNIV N J OBSERVATORY
THE EVOLUTION OF EARLY MAIN-SEQUENCE STARS,
by R. S. Kushwaha. 29 Jun 56, 19p. Contract Nonr-1358 (03) ,DA-36-034-ORD-1646
Unclassified report

Availability: Published in Astrophysical Journal V125 N1 P242-59 Jan 1957. Copies to DDC users only.

Descriptors: (*Stars, Nuclear reactions), Mathematical models, Astrophysics, Convection (Heat transfer), Chemical properties, Luminescence, Temperature, Hydrogen, Electrons, Scattering, Galaxies

The early phases of evolution for three early main-sequence stars with masses 10, 5, and 2.5 times the solar mass are considered. The range of spectral types covered is from B1 to A2. Radiation pressure is taken into account. Opacity is computed by straight addition of electron scattering and Kramers absorption with modified guillotine factor. The initial homogeneous models for these stars are constructed, and their evolution is followed. It is found that the convective core retreats, creating an inhomogeneous radiative zone between itself and the outer homogeneous radiative envelope. During the early evolutionary phases all the nuclear energy is generated inside the core. These early evolutionary phases are represented here by a series of three or four inhomogeneous models for each of the three stars. For the heaviest mass two later inhomogeneous models are also computed, in which the energy generation in the intermediate zone is accounted for. It is seen that the HR diagram constructed from these models agrees well with the observed one for galactic clusters. The theoretical models are also checked by computing the apsidal-motion constants for the three initial models, as well as for some of the later models. Quite reasonable agreement is found with the observations. (Author)

AD-624 193 Fld. 3/2
FLORIDA UNIV GAINESVILLE
A COMPARISON OF JUPITER'S RADIO SOURCES WITH ITS VISIBLE MARKINGS,
by Alex G. Smith, and T. D. Carr. 1961, 13p.
Contract NSF-G7066
Unclassified report

Prepared in cooperation with Maipu Radioastronomical Observatory, Univ. of Chile. Also supported by the Office of Naval Research and the Army Research Office, Durham.

Availability: Published in the Quarterly Journal of the Florida Academy of Sciences V24 N3 P185-96 Sep 1961. Copies to DDC users only.

Descriptors: (*Jupiter (Planet), Radio astronomy), (*Radio astronomy, Jupiter (Planet)), Extraterrestrial radio waves, Extraterrestrial topography, Correlation techniques, Astrophysics, Astronomical observatories, Chile

AD-624 194 Fld. 3/2
FLORIDA UNIV GAINESVILLE RADIO OBSERVATORY
RADIO SPECTRUM OF JUPITER,
by Alex. G. Smith. 1965, 10p. Contract NSF-G-13317 AROD 2083:9
Unclassified report

Availability: Published in Science V134 N3479 P587-95 1961. Copies to DDC users only.

Descriptors: (*Jupiter (Planet), Radio astronomy), (*Radio astronomy, Jupiter (Planet), Astrophysics, Extraterrestrial radio waves, Radiofrequency spectroscopy

AD-624 195 **See Fld. 4/1**

3/3. CELESTIAL MECHANICS

AD-624 133 **See Fld. 9/2**

4/1. ATMOSPHERIC PHYSICS

AD-623 755 Fld. 4/1
WASHINGTON UNIV SEATTLE DEPT OF ATMOSPHERIC SCIENCES
NOCTILUCENT CLOUDS OVER THE ARCTIC IN NOVEMBER.
Technical rept. revised,
by Arnold M. Hanson. 22 Jun 65, 3p. Rept. no. tr-18
Contract Nonr 477 (24) Proj. NR-307-252
Unclassified report

Revision of manuscript submitted 3 May 65.

Availability: Published in Journal of Geophysical Research V70 N18 P4717-8.

Descriptors: (*Noctilucent clouds, Arctic regions), (*Arctic regions, Noctilucent clouds), Clouds, Physical properties, Meteorological phenomena, Atmosphere, Optics

AD-623 756 Fld. 4/1, 4/2, 17/8
CFSTI Prices: HC $4.00 MF $0.75
HONEYWELL INC ST PAUL MINN SYSTEMS AND RESEARCH DIV
CONTAMINATION EFFECTS IN STRATOSPHERIC HUMIDITY MEASUREMENTS.
Final rept. for Jul 64-Jul 65,
by John G. Ballinger, Lyle E. Koehler, and Richard D. Murphy. Aug 65, 104p. Rept. no. Honeywell-1551-FR1
Contract AF19 (628)-3857 Proj. AF-6682 Task 668202
AFCRL 65-61
Unclassified report

Descriptors: (*Stratosphere, Humidity), (*Humidity, Stratosphere), (*Atmospheric sounding, Humidity), Contamination, Water vapor, Measurement, Airborne, Hygrometers, Meteorological balloons, Guided missiles, Spacecraft, Condensation trails, Detection

This report covers work done on solving some basic problems of stratospheric humidity measurements, in particular the contamination of the air sample by water vapor desorbed from the flight vehicle and instrument package. Results of theoretical and experimental studies of frost-layer dynamics are presented and their implications for automatic frost-point hygrometers are discussed. Instruments used on the program are described, and data from three stratospheric balloon soundings are presented and analyzed from a contamination standpoint. An optimum water-vapor sounding technique is suggested, along with recommendations for further study. (Author)

AD-623 876 Fld. 4/1, 20/6
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS OPTICAL PHYSICS LAB
SPECTRAL REFLECTANCE AND ALBEDO MEASUREMENTS OF THE EARTH FROM HIGH ALTITUDES.
Environmental research papers,
by Hans E. Band, and Louis C. Block. Sep 65, 30p. Rept. no. erp-136
Contract arpa-Order-363 Proj. DEFENDER, AF-8662 Task 86621
AFCRL 65-67

Unclassified report

Prepared in cooperation with Utah State Univ., Logan Contract AF19 (628)-3241.

Descriptors: (*Optics, Geophysics), Atmosphere, Earth, Solar radiation, Light, Rayleigh scattering, Reflection, Diffusion, Measurement, Airborne

Spectral radiance measurements over the wavelength range of 0.24 to 0.28 microns were carried out using Ebert-type scanning spectrometers mounted on the aft section of an X-15 aircraft operating up to 270,000 ft altitude. With the assumption of Rayleigh scattering in the atmosphere and allowing for ozone absorption, the reflectance and albedo are estimated and compared with the measured values. The elevations and azimuths of the sun and of the spectrometer during the flight were tabulated and used to compute the scattering and diffuse reflection angles. Apparent reflection of radiation from the ground is estimated, using a Lambert radiator model. Since the spectrometer at times pointed away from the earth, it should be possible to estimate the separate contribution of the ground to the reflectance and total albedo. (Author)

AD-623 922 Fld. 4/1, 4/2
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS AEROSPACE INSTRUMENTATION LAB
MONTHLY ATMOSPHERIC STRUCTURE SURFACE TO 80 KM.
Environmental research papers,
by Arthur J. Kantor, and Allen E. Cole. Aug 65, 21p. Rept. no. erp-131
Proj. AF-8624 Task 862401
AFCRL 65-63

Unclassified report

Availability: Published in Journal of Applied Meteorology V4 N2 P228-37 Apr 1965. Copies to DDC users only.

Descriptors: (*Atmospheric sounding, Thermal properties), Atmospheric temperature, Height finding, Meteorological parameters, Tables

Mean monthly atmospheric properties for latitudes 30, 45 and 60N are described. Temperature-height profiles were objectively derived from observed winds and temperatures, resulting in a family of atmospheres with internally consistent thermodynamic properties. The amplitude of seasonal changes in mean monthly temperatures and densities between 30 and 80 km increases with increasing latitude. The transition from one season to another of mean monthly atmospheric properties is relatively smooth except from late January to April in subarctic regions. (Author)

AD-623 932 Fld. 4/1, 7/4
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS UPPER ATMOSPHERE PHYSICS LAB
MASS SPECTROMETRIC MEASUREMENTS OF POSITIVE IONS AT ALTITUDES FROM 64 TO 112 KILOMETERS.
Environmental research papers,
by R. S. Narcisi, and A. D. Bailey. 9 Apr 65, 26p. Rept. no. erp-140
Proj. AF-6687 Task 6687-01
AFCRL 65-68

Unclassified report

Revision of manuscript submitted 24 Sep 64.

Availability: Published in Journal of Geophysical Research V70 N15 P3687-700 Aug 1 1965. Copies to DDC users only.

Descriptors: (*Ions, Upper atmosphere), (*Atmospheric sounding, Ions), (*Mass spectroscopy, Atmospheric sounding), Sounding rockets, Probes, Spectrum analyzers, Quadrupole moments, Aerodynamics, Plasma physics

A quadrupole mass spectrometer system employing a liquid nitrogen chilled zeolite pump has recently been developed for sampling positive ions at altitudes above 50 km. This system was flown successfully on a Nike Cajun rocket on October 31, 1963, at local noon from Eglin Air Force Base, Florida, and has provided the first positive ion composition measurements in the D region. The predominant ions detected within the D region (64 to 82 km) were 19 (;), 30 (+), and (37 = 1) (;), with 32 (+) rapidly rising above 75 km approaching the abundance of 30 (+) at 83 km. At 82.5 km a sharp transition occurred in the spectrums, characterized by the rapid disappearance of 19 (+) and 37 (+) and instantaneous appearance of six new ion peaks. Five of these ion peaks are suggested to be the metallic ions of sodium (23 (+), magnesium (24 (+), 25 (+), 26 (;), and calcium (40 (+). The metallic ions all exhibited an identical altitude profile: a 10-km-wide peak with a maximum at 95 km, a minimum at 105 km, and then a continuous increase until apogee at 112 km. Above 82 km the ions 30 (+) and 32 (+) appear to be the most predominant, although many other minor constituent ions are present. (Author)

AD-623 948 Fld. 4/1, 8/14
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
MEASURING LOW ENERGY PROTONS ON THE KOSMOS-41 SATELLITE,
by S. N. Vernov, and I. A. Savenko. 10 Nov 65, 14p. Rept. no. ftd-TT-65-1642
TT 65-64582

Unclassified report

Trans. of mono. Izmereniya Nizkoenergichnykh Protonov na Sputnike 'Kosmos-41', Buenos-Aires, 1965 9p.

Descriptors: (*Van Allen radiation belt, Protons), (*Protons, Van Allen radiation belt), Electrons, Terrestrial magnetism, Solar radiation, Cosmic rays, Upper atmosphere, Scientific satellites, USSR

Protons with energy 0.4-7 mev and electrons of outer radiation belt were measured. It is concluded that: (a) The outer proton belt represents a relatively stable formation and the time variation involves only the outer part of the belt, beginning with L > or = 4.5. (b) The presence of an identical altitude process and the nature of variations of low energy rotons and rigid electrons of the outer radiation belt at L > or = 5 indicates a generalization for both types of radiation entrapment and acceleration mechanism. (c) Taking into consideration the dependence of these variations upon the geomagnetic arrangement, it can be assumed, that this mechanism appears to be an anomalous diffusion of particles in the magnetosphere of the earth on account of relatively weak nonstationary perturbation of the geomagnetic field, which is observed quite frequently.

AD-624 071 Fld. 4/1, 14/2
PENNSYLVANIA STATE UNIV UNIVERSITY PARK IONOSPHERE RESEARCH LAB
D-REGION PROBE THEORY,
by David P. Hoult. 8 Mar 65, 5p. Contract DA-ARO (D)-31-124-G537 ,NsG-134-61 AROD 4515:2

Unclassified report

Availability: Published in Journal of Geophysical Research V70 N13 P3183-7 Jul 1 1965. Copies to DDC users only.

Descriptors: (*Atmospheric sounding, Probes), (*Probes, Atmospheric sounding), Electron density, Ionosphere, Airborne, Parachutes, Meteorological instruments

A systematic theory of a parachute-borne blunt probe operating in an altitude range from 50 to 80 km is presented. The relationships between positive ion, negative ion, and electron densities and the current to the probe and the probe voltage are found. It is shown that order of magnitude errors occur if a free molecular flow theory is used in this altitude range. No direct measurement of negative ion density is available for a probe voltage large compared to kT/e, the case considered. The results are somewhat analogous to Gerdien condenser theory. (Author)

AD-624 135 Fld. 4/1
CFSTI Prices: HC $4.00 MF $0.75
UNITED AIRCRAFT CORP EAST HARTFORD CONN
THE OBJECTIVE ANALYSIS OF HUMIDITY. AN UPPER-AIR HUMIDITY DIAGNOSTIC AND ANALYSIS TECHNIQUE.
Final rept. Oct 64-Aug 65,
by John T. Ball, Donald A. Chisholm, Paul V. Luty, and Keith W. Veigas. Oct 65, 116p. Contract AF19 (628)-3437 Proj. AF-1.0 Task 1.6
ESD TR-65-15

Unclassified report

Subcontracted to Travelers Research Center, Inc., Hartford, Conn., Rept. no. 7463-181.

Descriptors: (*Humidity, Atmospheric sounding), (*Atmospheric sounding, Humidity), Weather stations, Northern Hemisphere, Micrometeorology, Radiosondes, Meteorological parameters, Statistical analysis, Weather forecasting

A procedure has been developed to selectively diagnose upper-air humidity from surface observations and to utilize both diagnostic and radiosonde data in an objective analysis of dew-point spread using the successiveapproximation technique. Northern-hemisphere surfacesynoptic and radiosonde data from August through October 1964 are used to develop diagnostic relationships between surface-observed variables at a single station and the dew-point spread at the 850-, 700-, 500-, and 400-mb levels above that station for the warm season of the year. The approach consists of two steps: (1) the isolation within a decision-tree framework of those cases for which individual surface-observed variables yield highly reliable estimates of upper-level humidity, and (2) the application of a statistical technique (Regression Estimation of Event Probabilities) to the remaining cases to derive equations yielding probabilities of occurrence of specified categories of dew-point spread. This approach yields useful diagnostic information of variable quality. (Author)

AD-624 195 Fld. 4/1, 3/2
CFSTI Prices: HC $6.00 MF $1.25
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS SPACE PHYSICS LAB
GEOPHYSICS AND SPACE DATA BULLETIN. VOLUME II. NUMBER 2.
Quarterly rept. no. 2 for 1965,
by Anne L. Carrigan, and Norman J. Oliver. 1965, 224p.

Unclassified report

See also AD-621 314.

Descriptors: (*Geophysics, Periodicals), (*Space environmental conditions, Periodicals), Magnetometers, Cosmic rays, Neutron counters, Monitors, Radar echo areas, High

frequency, Electromagnetic waves, Propagation, Riometers, Solar radiation, Extraterrestrial radio waves, Atmospheric sounding

Contents: Total field intensity magnetometer; Cosmic ray neutron intensity monitor; Oblique backscatter radar; Oblique H-F propagation; Riometer, Solar optical patrol observations; Solar radio emission, and Vertical incidence ionospheric soundings.

AD-623 899 See Fld. 20/9

AD-623 925 See Fld. 3/2

AD-623 928 See Fld. 8/14

AD-623 934 See Fld. 4/2

AD-623 940 See Fld. 7/4

AD-623 941 See Fld. 4/2

AD-623 986 See Fld. 20/14

AD-623 993 See Fld. 8/14

AD-624 041 See Fld. 20/8

AD-624 121 See Fld. 5/1

4/2. METEOROLOGY

AD-623 713 Fld. 4/2, 16/1
CFSTI Prices: HC $3.00 MF $0.75
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS METEOROLOGY LAB
SUMMARY OF ONE YEAR OF DATA FROM THE CAPE KENNEDY WIND SYSTEM.
Air Force Surveys in Geophysics,
by Joan Dwyer, and Gordon L. Tucker. Aug 65, 83p. Rept. no. afsig-169
Proj. AF-8604 Task AF8604-01
AFCRL 65-63

Unclassified report

Descriptors: (*Weather stations, Guided missile ranges), (*Guided missile anges, Weather stations), (*Micrometeorology, Weather stations), Climatology, Florida, Ranges (Establishments), Meteorological parameters, Atmosphere, Transport properties, Diffusion, Turbulence, Air pollution, Toxicity, Rocket propellants, Guided missile safety, Automatic, Meteorological instruments

In July of 1962, an automatic computer-controlled meteorological data acquisition and processing system became operational at Cape Kennedy, Florida. One year of data from this Weather Information Network and Display (WIND) System has been edited. Selected parameters are presented in climatological summaries in this report. (Author)

AD-623 787 Fld. 4/2
CFSTI Prices: HC $7.00 MF $1.75
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS METEOROLOGY LAB
A FAMILY OUTBREAK OF SEVERE LOCAL STORMS. A COMPREHENSIVE STUDY OF THE STORMS IN OKLAHOMA ON 26 MAY 1963, PART I.
Special rept.,
by Keith A. Browning, and Tetsuya Fujita. Sep 65, 347p. Rept. no. sr-32
Proj. AF-8620 Task 862004
AFCRL 65-695 (I)

Unclassified report

Descriptors: (*Storms, Oklahoma), (*Air mass analysis, Storms), Tornadoes, Hail, Weather stations, Meteorological radar, Photographic techniques, Atmospherics, Radioactive fallout, Atmospheric motion, Mathematical models, Weather forecasting

This monograph is a case study of an outbreak of severe local storms that produced several tornadoes and extensive large hail in Oklahoma on 26 May 1963. Several authors have combined to describe the organization, structure, and evolution of these storms from a number of points of view. The storms are analyzed on four different size scales: (1) as products of their large-scale environment, (2) as members of a mesoscale system or family unit, (3) as individual evolving cells, and (4) as tornado and hail factories, with the emphasis on the tornadoes and the hailstones themselves. Data are obtained from conventional synoptic and mesosynoptic networks, visual and photographic observations, surface weather surveys, weather radars, sferics detectors, balloon tracks, radioactivity measurements in precipitation, and hailstone thin sections. Simple models are presented describing the airflow, structure and life cycle of individual severe local storms. (Author)

AD-623 845 Fld. 4/2, 15/5
CFSTI Prices: HC $1.00 MF $0.50
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
STUDIES OF SNOW MOVEMENT IN A WIND DUCT.
Technical rept.,
by N. S. Stehle. Nov 65, 24p. Rept. no. tr-R-420
Proj. Y-F015-11-01-025

Unclassified report

Descriptors: (*Snow, Aerodynamic characteristics), Wind tunnels, Tests, Civil engineering, Snow removal

Drifting snow in polar areas with permanent snowfields presents problems in logistics and maintenance. To better understand the physics and mechanics of snow movement, studies are being conducted at the U. S. Naval Civil Engineering Laboratory in a 23-1/2-foot-long wind duct at wind speeds from 5 to 20 mph with temperatures from -35 to +20F. At these speeds, movement of in-place snow on the floor of the tunnel depends on the amount of snow added to the airstream. The amount of in-place snow moved is dependent on wind velocity, air temperature, exposure to solar radiation, and the physical properties of snow. Wind-duct tests using snow should be continued to determine the effect of prolonged wind, solar radiation, snow temperature, and varied surface patterns on drifting. (Author)

AD-623 900 Fld. 4/2, 14/2
CFSTI Prices: HC $1.00 MF $0.50
COLORADO STATE UNIV FORT COLLINS FLUID DYNAMICS AND DIFFUSION LAB
LOCAL ISOTROPY IN WIND TUNNEL TURBULENCE.
Technical rept.,
by V. A. Sandborn, and R. D. Marshall. Sep 65, 25p. Contract DA-AMC-28-043-64-G9

Unclassified report

Descriptors: (*Turbulent boundary layer, Wind tunnels), (*Atmospheric motion, Atmosphere models), Flat plate models, Spectroscopy, Axially symmetric flow, Micrometeorology

Experimental evaluation of the longitudinal turbulent spectrum in the boundary layer of a long test section wind-tunnel is reported. The spectra agree very close with spectra reported for water flow in an ocean tidal channel and also for air flow over the sea surface. The spectra all agree with the predictions of local isotropy. The data reported were taken in a flat plate boundary layer at a station 69 feet from the tunnel entrance. The free-stream velocity was 30 feet per second. These flat plate boundary layer spectra differ greatly from previous data reported for flows with much small length dimensions. (Author)

AD-623 901 Fld. 4/2
CFSTI Prices: HC $3.00 MF $0.50
COLORADO STATE UNIV FORT COLLINS FLUID DYNAMICS AND DIFFUSION LAB
MEASUREMENTS IN A THERMAL BOUNDARY LAYER.
Technical rept.,
by V. A. Sandborn, C. Y. Liu, and M. C. Tao. Sep 65, 56p. Contract DA-AMC-28-043-64-G9

Unclassified report

Descriptors: (*Turbulent boundary layer, Wind tunnels), (*Atmospheric temperature, Measurement), (*Atmospheric motion, Measurement), Partial differential equations, Micrometeorology, Flat plate models, Velocity, Density

A problem encountered in the flow of atmospheric winds over the earth surface is that of cold air over a warm boundary. The study is a part of a long range program directed toward understanding such flows. An exploratory set of measurements in the boundary layer over a heated, smooth, flat plate are reported. The boundary wall was maintained at approximately 85F and the free stream air temperature was approximately 40F. The free stream velocity was 20 feet per second. Measurements of the mean temperature, density and velocity distributions are given in both tabular and graphic data. Data on the fluctuating temperature, longitudinal velocity and velocitytemperature correlation are also presented. The data were taken as an exploratory study to first determine the magnitude of the mean and turbulent terms in the boundary layer. Secondly, the present experiment indicated the problems to be overcome in measuring the thermal boundary layer. The report is intended as a data report on the-measurements. (Author)

AD-623 902 Fld. 4/2
CFSTI Prices: HC $1.00 MF $0.50
COLORADO STATE UNIV FORT COLLINS FLUID DYNAMICS AND DIFFUSION LAB
A THREE-DIMENSIONAL SINGLE ROUGHNESS ELEMENT IN A TURBULENT BOUNDARY LAYER,
by H. W. Tieleman, and V. A. Sandborn. Sep 65, 21p. Contract DA-AMC-28-043-64-G9

Unclassified report

Descriptors: (*Turbulent boundary layer, Roughness), (*Atmospheric motion, Roughness), Flat plate models, Micrometeorology, Pressure, Velocity, Spheres, Buildings, Three-dimensional flow, Wind tunnels

An investigation of the influence of a single roughness element (sphere) in a turbulent boundary layer of a smooth flat plate is reported. The pressure distribution around the surface of the sphere was measured. Integration of the pressure distribution was used to compute the drag and lift forces on the element. Measurements of the mean and turbulent velocity distributions in the boundary-layer behind the sphere were made. (Author)

AD-623 923 Fld. 4/2
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS METEOROLOGY LAB
ATMOSPHERIC WATER VAPOR DIVERGENCE MEASUREMENTS AND APPLICATIONS,
by Arnold A. Barnes,Jr.. Jul 65, 16p. Rept. no. special repts. 28
Proj. AF-8604 Task 860407
AFCRL 65-50

Unclassified report

Availability: Published in Humidity and Moisture V2 P513-22 ND. Copies to DDC users only.

Descriptors: (*Atmospheric sounding, Water vapor), (*Water vapor, Atmosphere), Northern Hemisphere, Humidity, Distribution, Maps, Evapotranspiration, Artificial precipitation, Hydrology

Maps of water vapor divergence as determined from actual atmospheric soundings are presented for the Northern Hemisphere. The yearly mean divergence maps for 1950 and 1958 are compared to show the similarities and differences between the two years. Applications of this part of the hydrological cycle are considered. Effects of damming the Mediterranean at the Strait of Gibraltar and filling the Qattara Depression in Egypt are investigated in terms of altering local precipitation and weather modification. (Author)

AD-623 934 Fld. 4/2, 4/1
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS METEOROLOGY LAB
CLOUD AND TERRESTRIAL ALBEDO DETERMINATIONS FROM TIROS SATELLITE PICTURES.
Environmental research papers,
by John H. Conover. Sep 65, 20p. Rept. no. erp-137
Proj. AF-6698 Task 669802
AFCRL 65-67

Unclassified report

Availability: Published in Journal of Applied Meteorology V4 N3 P378-86 Jun 1965. Copies to DDC users only.

Descriptors: (*Meteorological satellites, Aerial photography), (*Aerial photography, Meterological satellites), (*Cloud cover, Aerial photography), (*Weather forecasting, Meteorological satellites), Optics, Atmosphere, Earth, Electromagnetic wave reflections

AD-623 941 Fld. 4/2, 4/1, 20/4
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS AEROSPACE INSTRUMENTATION LAB
EMPIRICAL RELATIONSHIPS BETWEEN GUST INTENSITY IN CLEAR-AIR TURBULENCE AND CERTAIN METEOROLOGICAL QUANTITIES.
Environmental research papers,
by G. S. McLean, and R. M. Endlich. Aug 65, 17p. Rept. no. ERP-132
Proj. AF-8624 Task 862402
AFCRL 65-63

Unclassified report

Availability: Published in Journal of Applied Meteorology V4 N2 P222-7 Apr 1965. Copies to DDC users only.

Descriptors: (*Clear air turbulence, Meteorological parameters), Atmospheric motion, Jet streams (Meteorology), Wind, Gusts, Intensity, Correlation techniques, Atmospheric sounding, Research aircraft

Due to a lack of observational data, little information exists in the literature concerning quantitative relationships between turbulent gust intensity in the free atmosphere and commonly measured meteorological quantities. Measurements of turbulence, wind, and temperature made by a B-47 research aircraft are used to investigate such relationships in order to satisfy several practical needs. It is found that a quantity that is the product of wind speed and turning of the wind with height is more closely related to turbulent gust intensity than vertical wind shear or Richardson's number. Variations in the frequency of occurrence of turbulence are determined as the quantities mentioned above increase in magnitude. Moderate or severe turbulence has a frequency of occurrence greater than 50 per cent when the product of wind speed and vertical change of direction exceeds 0.8 deg/sec, when vertical shear exceeds 0.027/sec, or when Richardson's number is less than 0.4 (for calculations made over 2000-ft layers). The writers believe that the results are representative of winter conditions in midlatitudes. (Author)

AD-623 756 See Fld. 4/1

AD-623 836 See Fld. 19/4

AD-623 922 See Fld. 4/1

AD-623 946 See Fld. 20/4

AD-624 092 See Fld. 8/6

AD-624 121 See Fld. 5/1

5/1. ADMINISTRATION AND MANAGEMENT

AD-623 725 Fld. 5/1, 5/9, 5/10
CFSTI Prices: HC $2.00 MF $0.50
MASSACHUSETTS INST OF TECH CAMBRIDGE
ATTITUDE CHANGE DURING MANAGEMENT EDUCATION: A STUDY OF ORGANIZATIONAL INFLUENCES ON STUDENT ATTITUDES.
Technical rept.,
by Edgar H. Schein. Sep 65, 40p. Rept. no. tr-2 140-65
Contract Nonr-1841 (83)

Unclassified report

Descriptors: (*Management engineering, Education), (*Education, Management engineering), (*Students, Attitudes), Instructors, Supervision, Professional personnel, Adjustment (Psychology), Test construction (Psychology), Industrial psychology, Reaction (Psychology)

The study was conducted to determine (1) what patterns of attitudes and values characterize the faculty and students of the M. I. T. Sloan School of Management and (2) what changes occur in the attitudes and values of students during their management education. The study was carried out with 2 student populations (one was enrolled in a 2-year curriculum leading to an S. M. degree in management, and the other was a group of middlelevel managers sent by their companies to obtain the degree in 12 months), a group of senior executives attending the School for a 10-week management development course, and the faculty. Attitudes were surveyed with an objective questionnaire consisting of 100 belief or value statements; factor analysis indicated 19 reliable attitude scales, including in a scale only those items tending to cluster. On at least half the scales, faculty and executives differed markedly in attitudes and values. The initial position of the graduate student fell between the faculty and executive extremes. The faculty apparently influenced the students in a number of attitude areas but made the graduates less similar to managers whom they are likely to encounter in industry.

AD-623 825 Fld. 5/1, 12/2, 14/1
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
OPTIMAL LINEAR INVENTORY CONTROL AND FIRST ORDER EXPONENTIAL SMOOTHING,
by Dale M. Landi, and B. M. Johnson. Nov 65, 13p. Rept. no. P-3264

Unclassified report

Prepared in cooperation with Connecticut Univ., Storrs.

Descriptors: (*Inventory control, Optimization), (*Numerical analysis, Inventory control), Stock level control, Management planning, Model theory, Costs

A linear, fixed-interval stock replenishment policy that achieves an optimal cost balance between inventory and order-level variance is derived. One form of the reorder rule relies on first order exponential smoothing to predict the random components of the demand sequence, which are assumed to be pairwise uncorrelated with mean zero and variance that either grows or decays geometrically, or remains constant in time. (Author)

AD-624 121 Fld. 5/1, 4/1, 20/5, 20/4,+
CFSTI Prices: HC $3.00 MF $0.75
AEROSPACE TECHNOLOGY DIV LIBRARY OF CONGRESS WASHINGTON D C
FOREIGN SCIENCE BULLETIN, 1965, VOL. 1, NO. 11.
Nov 65, 69p. TT 65-64592

Unclassified report

A monthly review of selected foreign scientific and technical literature sponsored by the Department of Defense.

Descriptors: (*Scientific research, Reviews), USSR, Atmospherics, Lasers, Pumping (Optical), Boundary value problems, Laminar boundary layer, Terrestrial magnetism, High-temperature research, Semiconductors, Life support, Manned spacecraft, Telescopes, Transistors, Noctilucent clouds, Seismology, Atmosphere

Contents: Analysis of atmospherics propagated over land and sea masses; Electron-beam-pumped CdTe and GaSe lasers; Origin of the earth's radiation belts and the correlation between the belts and the ionosphere; A new method for solving laminar boundary-layer problems; The search for high-temperature semiconductor materials; Highlights of soviet bioastronautics at the 16th IAF Congress; Astronomic telescope on the moon; Designations of soviet transistors; All-Union Scientific conference on noctilucent cloud research; Seismology conference at Ashikhabad; Oblique-incidence backscatter sounding of the ionosphere; Interrelationship of processes in the troposphere and stratosphere in the northern hemisphere surface love waves.

AD-624 143 Fld. 5/1
CFSTI Prices: HC $2.00 MF $0.50
OFFICE OF NAVAL RESEARCH WASHINGTON D C
EVALUATION OF BASIC RESEARCH FOR ADMINISTRATIVE CONTROL,
by Richard H. Wilcox. 10 Sep 65, 30p. Rept. no. onr-ACR-111

Unclassified report

Descriptors: (*Scientific research, Management control systems), (*Research program administration, Management control systems), Navy, Analysis, Effectiveness, Management engineering, United States Government, Naval research

A government agency such as the Office of Naval Research, which funds basic research through contracts or grants, must make many decisions which affect the course of that research. Contract renewal or support level modifications are particularly important, but several other types of action (including lack of action) have important effects. Unfortunately, the unpredictability of basic research and the absence of a profit motive make quantitative evaluation and objective decision making difficult if not impossible. Further, the interests of the sponsoring agency (e.g., the Navy) must be pursued without unduly restricting or hindering the research work itself. To help guide admittedly subjective evaluation, and thus serve as a guide for rational decision making in research administration, the author proposes a utility model which multiplicatively combines factors representing the primary considerations of quality and appropriateness of research and communication of results; further provision is also made additively for important supplemental considerations. Numerous available indicators of these factors and their sources are identified. The report is concerned solely with evaluation of existing research tasks, not with selection of new ones for support. (Author)

5/2. DOCUMENTATION AND INFORMATION TECHNOLOGY

AD-624 000 Fld. 5/2
CFSTI Prices: HC $3.00 MF $0.75
DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA
COSATI SUBJECT CATEGORY LIST (DOD-MODIFIED).
1ST Edition.
Oct 65, 73p.

Unclassified report

Descriptors: (*Subject indexing, Classification), (*Classification, Handbooks), (*Documentation, Classification), Indexes, Scientific research, Dissemination

The first edition of the DoD-Modified COSATI Subject Category List provides a basis for the subject grouping of reports for announcement and distribution purposes. The categorization is based on the first edition of the 'COSATI Subject Category List,' December 1964, AD-613 200. There are 22 broad subject Fields and 188 Groups. Ten of these groups were added to the COSATI list to provide greater specificity as required by Enclosure 1 of DoD Instruction 5200.21. The additional groups were assigned decimal numbers which relate them to the parent COSATI Group. Scope notes indicate the subject coverage of each Group and give cross-references to related Groups. An extensive subject index based on the DDC Descriptor vocabulary is included. The index provides additional information on the definitions of the Fields and Groups. The Fields and Groups form the basis for the arrangement of document entries in the 'Technical Abstract Bulletin.' The determination of need-to-know and the certification of requests for classified documents are based on these subject groups. (Author)

AD-624 057 Fld. 5/2
CFSTI Prices: HC $6.00 MF $1.25
AMERICAN ORDNANCE ASSOCIATION WASHINGTON D C ENGINEERING DOCUMENTATION SECTION
MINUTES OF STEERING COMMITTEE MEETING, OCTOBER 6-7, 1965 AT EASTOVER LENOX, MASSACHUSETTS.
Technical rept.
7 Oct 65, 208p.

Unclassified report

Descriptors: (*Documentation, Military requirements), Air force, Industries, Management engineering, Standards, Standardization, Symposia, Data, Manmachine systems, Department of Defense, Graphics, Computers, Engineering, Specifications, Navy

AD-624 058 Fld. 5/2
CFSTI Prices: HC $1.00 MF $0.50
INTERLABORATORY COMMITTEE ON EDITING AND PUBLISHING CORONA CALIF
TITLING TECHNICAL REPORTS FOR OPTIMUM USE AND RETRIEVAL,
by H. L. Chadbourne. Aug 65, 16p. Rept. no. ilcep-Monograph-7

Unclassified report

Descriptors: (*Documentation, Reports), (*Reports, Documentation), Military publications, Information retrieval

Technical reports need proper titles to prevent information loss and save reading time. Fortunately, the requirements of use and retrieval are completely compatible. Main titles should employ standard terminology and should be specific, precise, short, and unclassified. Subtitles should be used and should cover secondary-level information, such as extent of subject coverage, type of approach, action taken, and results achieved. Good title-subtitle units may be composed in a few minutes' time. (Author)

AD-624 211 Fld. 5/2
OFFICE OF NAVAL RESEARCH WASHINGTON D C
DDC SERVICES FOR THE R AND D COMMUNITY,
by Charles De Vore. 1965, 2p.

Unclassified report

Availability: Published in Signal P65-6 May 1965. Copies to DDC users only.

Descriptors: (*Documentation, Department of Defense), (*Department of Defense, Documentation), History, Scientific research, Reports, Bibliographies

A history is given of the Defense Documentation Center. The 'Technical Abstract Bulletin' is described, as are the bibliographies available from DDC. The steps required for government contractors and grantees to obtain DDC documents and other services are outlined.

AD-624 241 Fld. 5/2, 9/2
CFSTI Prices: HC $2.00 MF $0.50
UNIVAC BLUE BELL PA
SOME NOTES ON THE USE AND DATA PROCESSING ASPECTS OF ASSOCIATION FACTORS IN IS AND R SYSTEMS,
by Earl G. Fossum, and Gilbert Kaskey. 30 Mar 65, 30p. Rept. no. technical Status-5
Contract AF49 (638)-1194 Proj. AF-9769 Task 976901
AFOSR 65-1702

Unclassified report

Descriptors: (*Subject indexing, Effectiveness), (*Information retrieval, Effectiveness), Data processing systems, Statistical analysis, Classification, Probability, Correlation techniques

A number of methods have been proposed to utilize the statistical properties of pair-occurrences of index terms used to describe documents in a library. The common objective is to increase the number of terms in an original search request by the addition of others 'highly associated' with them. For the study being conducted by UNIVAC a large sample of DDC (formerly ASTIA) documents were used for testing and evaluating some of the several measures of association which have been proposed, and for determining the implications of their use upon the configurations of a data processing system used in an information storage and retrieval application. The formulation of the exact purpose and nature of such tests requires incorporating the use of association factors into the total specifications of an operating IS and R system. A number of the problems connected with attempts to accomplish this are discussed. (Author)

AD-623 736 See Fld. 9/2

AD-623 938 See Fld. 9/2

AD-623 960 See Fld. 17/2

AD-624 110 See Fld. 9/2

5/3. ECONOMICS

AD-623 885 Fld. 5/3
CFSTI Prices: HC $2.00 MF $0.50
STANFORD UNIV CALIF INST FOR MATHEMATICAL STUDIES IN THE SOCIAL SCIENCES
VARIABLE RETURNS TO SCALE IN GENERAL EQUILIBRIUM THEORY.
Technical rept.,
by Ronald W. Jones. 22 Nov 65, 26p. Rept. no. tr-138
Contract Nonr-225 (50) Proj. NR-047-004

Unclassified report

Descriptors: (*Economics, Theory), (*Commerce, Economics), Factor analysis, Industrial production, Consumption, Model theory

The validity of two standard theorems in the pure theory of international trade (the Stolper-Samuelson theorem and the Rybczynski theorem) is examined in a competitive general equilibrium model where external economies and/or diseconomies are introduced. Either theorem may be invalidated when there exist sufficiently strong external economies or if external effects are sufficiently 'biased'. These findings are related to the shape of the community's production-possibilities schedule, which can be 'bowed-in' even in the absence of external economies. (Author)

AD-624 022 Fld. 5/3
CFSTI PricesMF $1.25
DEPARTMENT OF JUSTICE WASHINGTON D C
IDENTICAL BIDDING IN PUBLIC PROCUREMENT.
Fourth rept. of the Attorney General under Executive Order 10936.
Oct 65, 241p.

Unclassified report

See also AD-612 917.

Availability: GPO: HC $1.50.

Descriptors: (*Government procurement, Bargaining), (*Bargaining, Costs), United States Government, Materials, Propellants, Fuels, Electric cables, Electric wire, Commerce, Industrial production, Statistical data, Procurement

The volume of public procurement reported to have been affected by identical bidding fell from $65.6 million in 1962 to $42.6 million in 1964, a decline of 35 percent. Experience under the Executive order since 1962 makes it clear that identical bidding does not affect a very large share of public procurement. The $42.6 million of public procurement reported under the Executive order in 1964 represented only four-tenths of one percent of the estimated $11.2 billion purchases of all public agencies participating in the reporting program, and the incidence of identical bidding has declined steadily from 0.7 percent in 1962. In 1964 fewer product classes were affected by identical bidding than in the two preceding years. The number of product classes affected fell from 212 in 1962 to 167 in 1964. Nevertheless, identical bidding persisted in 130 identical product classes in 1963 and 1964. The classes reporting the largest volume of purchases at the Federal level in 1964 were liquid petroleum propellant and fuels, and electrical wire and cable. At the State and local levels the largest volume classes were wire and cable and mineral construction materials.

5/4. HISTORY, LAW AND POLITICAL SCIENCE

AD-623 841 Fld. 5/4
CFSTI Prices: HC $4.00 MF $0.75
BUREAU OF SOCIAL SCIENCE RESEARCH INC WASHINGTON D C
THE SOCIAL SCIENCES IN INTERNATIONAL AND MILITARY POLICY: AN ANALYTIC BIBLIOGRAPHY.
Interim rept.,
by Elisabeth T. Crawford. Oct 65, 109p. Contract AF49 (638)-1344 Proj. AF-9779 Task 9779-02
AFOSR 65-1890

Unclassified report

Descriptors: (*Social sciences, Bibliographies), (*Political sciences, Bibliographies), (*Foreign policy, United States Government), Military strategy, Sociology, Economics, Public opinion, Decision making, Attitudes

The bibliography presents selective materials pertaining to the role of social science research in international and military policy and operations since the beginning of World War II. The bibliography lists 150 references to books, articles and reports, all of which are part of the open litera-

ture. The references are annotated. The report also contains an Introduction which discusses the purpose of the bibliography, its scope, the sources from which the works cited are drawn and some limitations of the available literature. The bibliography is divided into five parts. Part I lists general works discussing the role of social science research in public policy. Part II lists work which show the trends in the relationship of government and the social science community in the area of international and military affairs since the beginning of World War II. Parts III and IV list literature which suggests some analytic categories to be used in studying social science research and international and military policy. Part V, finally, contains writings which give a theoretical perspective on the roles of applied social science. (Author)

5/5. HUMAN FACTORS ENGINEERING

AD-623 731 Fld. 5/5, 16/4
CFSTI Prices: HC $6.00 MF $1.25
HUMAN ENGINEERING LABS ABERDEEN PROVING GROUND MD
HUMAN FACTORS ENGINEERING DESIGN STANDARD FOR MISSILE SYSTEMS AND RELATED EQUIPMENT,
by Robert F. Chaillet. Sep 65, 254p. Rept. no. hel-Standard-S-3-65
Unclassified report

Descriptors: (*Human engineering, Standards), (*Guided missiles, Human engineering), Display systems, Design, Anthropometry, Control systems, Visual perception, Labels, Communication systems, Optical instruments, Storage, Maintenance, Guided missile safety, Systems engineering

The purpose of the Standard is to provide human factors engineering design principles and detailed criteria. The design principles are expressed as general rules applicable during missile system research and development programs, or as essential items to be considered during design, to insure the incorporation of sound human factors engineering practices. The detailed criteria consist of dimensions, ranges, tolerances and other specific data. The range of acceptable dimensions and other factors may be rather large in some cases.

5/7. LINGUISTICS

AD-623 769 Fld. 5/7, 9/2
CFSTI Prices: HC $2.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
WORD CONCEPTS: A THEORY AND SIMULATION OF SOME BASIC SEMANTIC CAPABILITIES,
Professional paper,
by Ross Quillian. 15 Sep 65, 41p. Rept. no. sp-2199
Unclassified report

Descriptors: (*English language, Programming (Computers)), (*Semantics, Programming (Computers)), (*Word association, Programming (Computers)), Dictionaries, Vocabulary, Computer storage devices, Simulation, Theory, Memory

In order to discover design principles for a large memory that can enable it to serve as the base of knowledge underlying human-like language behavior, experiments with a model memory are being performed. This model is built up within a computer by 'recoding' a body of information from an ordinary dictionary into a complex network of elements and associations. Then the ability of a program to use the resulting model memory effectively for simulating human performance provides a test of its design. One simulation program, now running, is given the model memory and is required to compare and contrast the meanings of arbitrary pairs of English words. For each pair, the program locates any relevant semantic information within the model memory, draws inferences on the basis of this, and thereby discovers various relationships between the meanings of the two words. Finally, it creates English text to express its conclusions. The design principles embodied in the memory model together with some of the methods used by the program constitute a theory of how human memory for semantic and other conceptual material may be formatted, organized, and used. (Author)

AD-623 926 Fld. 5/7
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS DATA SCIENCES LAB
ON THE ACOUSTIC BASIS OF THE PERCEPTION OF INTONATION BY LINGUISTS.
Physical sciences research papers,
by Philip Lieberman. Aug 65, 24p. Rept. no. psrp-122
Proj. AF-5628 Task 5628-02
AFCRL 65-54
Unclassified report

Availability: Published in Word V21 N1 P40-54 Apr 1965. Copies to DDC users only.

Descriptors: (*Speech representation, Acoustics), (*Speech, Perception), (*Linguistics, Acoustics), Hearing, Pitch discrimination, Sound pitch, Stress (Physiology), Throat, Respiratory system, Muscles, Grammars

The experiment is directed at isolating some aspects of fundamental frequency that are relevant to the perception of intonation. It shows that the pitch levels and terminal symbols of the Trager-Smith system (the most used notation in the USA) often have no direct physical basis. The linguist infers their presence from his knowledge of the transcriptions that the Trager-Smith system usually uses for certain combinations of words. The same comments seem to apply to secondary and tertiary stresses. Moreover, the results of this experiment indicate that there is no basis for regarding the Trager-Smith pitch levels as the perceptual manifestations of either absolute or relative fundamental frequency ranges except for certain contours that recur quite frequently in normal discourse. However, these contours appear to be perceived as complete entities. An independently motivated generative model shows that the intonation of a sentence can be predicted if one considers three sets of factors: (1) the physiological constraints imposed by the human respiratory system (2) the emotional state of the speaker, and (3) the ultimate recoverability of the Deep Phrase Marker that underlies the final phonological shape of the sentence. (Author)

AD-624 148 Fld. 5/7, 9/2
CFSTI Prices: HC $3.00 MF $0.75
THOMPSON RAMO WOOLDRIDGE INC CANOGA PARK CALIF
A MANUAL FOR AUTOMATIC DICTIONARY REVISION.
15 Sep 60, 80p. Rept. no. c97-OU7
Contract AF30 (602)-2140
Unclassified report

Descriptors: (*Dictionaries, Programming (Computers)), Russian language, English language, Flow charting, Machine translation, Automatic, Computers

A process is outlined for the automatic revision of a bilingual technical dictionary where (1) a foreign source word is new to the dictionary or (2) the english equivalent chosen for a new word is not listed in the dictionary. The manual includes the following: General description of automatic dictionary revision; details of the matching program; evaluating the match; output of the matching process; manpower and computer requirements; dictionary search computer procedure; and use of Harvard Automatic Dictionary technique in updating the glossary.

5/8. MAN-MACHINE RELATIONS

AD-623 794 **See Fld. 5/10**

5/9. PERSONNEL SELECTION, TRAINING AND EVALUATION

AD-623 774 Fld. 5/9, 5/10
CFSTI Prices: HC $1.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
PROJECT SUMMARY: VOCATIONAL INTERESTS OF COMPUTER PROGRAMMERS.
Technical memo.,
by Dallis K. Perry, and William M. Cannon. 15 Oct 65, 11p. Rept. no. tm-2655/001/00
Unclassified report

See also AD-623 775.

Descriptors: (*Programmers, Aptitude tests), Problem solving, Mathematics, Behavior, Males, Psychometrics

The Strong Vocational Interest Blank was administered to 1378 computer programmers in business, industry, education and government. Programmers were found to be especially interested in problem- and puzzle-solving activities, including all forms of mathematics as well as mechanical activities. They prefer varied, rather than routine, activities and dislike close personal interactions with people. Their scores on existing occupational scales indicate a combination of applied scientific and administrative interests, but none of the existing scales adequately represents the interests of programmers. A Programmer interest key was developed and found to be highly valid for differentiating between programmers and men in general. Applications of the key in counseling and selection are discussed, and further research needed to complete the study of programmer's vocational interests is outlined. (Author)

AD-623 775 Fld. 5/9, 5/10
CFSTI Prices: HC $3.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
SVIB SCORES AND PROGRAMMER KEY: VOCATIONAL INTERESTS OF COMPUTER PROGRAMMERS.
Technical memo.,
by Dallis K. Perry, and William M. Cannon. 15 Oct 65, 55p. Rept. no. tm-2655/002/00
Unclassified report

See also AD-623 774.

Descriptors: (*Programmers, Aptitude tests), Psychometrics, Professional personnel, Programming (Computers), Attitudes, Problem solving, Mathematics, Test construction (Psychology), Males

The revised Strong Vocational Interest Blank (SVIB) and a background information form were administered to 1378 computer programmers. The total group of participants was reduced, for major analyses, to 1003 male programmers who had at least two years of programming experience, whose jobs consisted primarily of non-supervisory programming tasks, and who indicated satisfaction with programming as an occupation. Programmers differ from other professional men primarily in their greater interest in problem-solving activities, including both mathematics and mechanical pursuits, and their lesser interest in people. A Programmer interest key was developed on one half of the sample and evaluated on the remaining half. The key provides good differentiation between programmers and men in general, and programmers satisfied with their occupation score significantly higher than dissatisfied programmers. Several key construction techniques were applied. One that is still in process may provide a more effective key. Normative data are provided for the key, and its potential usefulness in counseling, guidance, and selection are discussed. (Author)

AD-623 826 Fld. 5/9
CFSTI Prices: HC $1.00 MF $0.50
NAVAL SCHOOL OF AVIATION MEDICINE PENSACOLA FLA
THE USE OF SEPARATE PREDICTION FORMULAE BASED ON THE PROCUREMENT SOURCE OF OFFICER FLIGHT STUDENTS.
Special rept.,
by Charles W. Hutchins,Jr.. 23 Aug 65, 11p.
Rept. no. sr-65-6
Unclassified report

Descriptors: (*Aviation personnel, Selection), (*Officer personnel, Selection), Flight, Training, Psychometrics, Military personnel, Performance (Human), Statistical analysis, Correlation techniques, Tests

Separate multiple prediction formulae were computed on each of the six major procurement source subgroups of the entering officer flight students. This procedure for developing prediction formulae was compared with two other conditions: a pseudovariable condition, which treats each procurement source as a separate dichotomous variable, and the current condition which treats the entire officer group as a whole without taking procurement source into account. Two criteria were used for this comparison, namely, the crossvalidation coefficients of each condition, and the disciminatory power of the respective conditions as measured by the percentage of attritions placed in the lowest 10 per cent of the respective predictor scores. The separte formula condition was the most valid upon crossvalidation and was also found to have the best discrimination at the low end of the range; however, its superiority in the former case failed to reach statjstical significance. (Author)

AD-623 916 Fld. 5/9
CFSTI Prices: HC $1.00 MF $0.50
HARVARD UNIV CAMBRIDGE MASS
THE RELATION OF POSTTEST PERFORMANCE TO RESPONSE-CONTINGENCIES IN PROGRAMMED INSTRUCTION,
by Mark A. Sherman. Jun 65, 15p. Contract AF19 (628)-2404 Proj. AF-7682 Task 768204
ESD TR-65-357
Unclassified report

Descriptors: (*Programmed instruction, Effectiveness), Teaching machines, Students, Tests, Recall, Learning, Performance (Human)

Two programs, containing fictitious subject matter, were employed in a study designed to compare the teaching effectiveness (as measured by posttest) of textual material presented (1) as contingencies for responses in a program, or (2) as material upon which responses were not contingent. The content of the programs was identical, and they differed only in that material whose reading was necessary for correct responding in one program was not necessary for correct responding in the other and vice versa. The posttest was the same for all subjects. Half of the posttest related to material which was responsecontingent in one of the programs, and the other half related to material which was response-contingent in the other program. Results indicate that responsecontingent material leads to higher posttest scores than the same material when it is not necessary for correct responding within the program. The probability of information being acquired from a program is increased when this information is response-contingent. (Author)

AD-623 918 Fld. 5/9, 15/3
CFSTI Prices: HC $5.00 MF $1.00
IOWA AGRICULTURAL AND HOME ECONOMICS EXPERIMENT STATION AMES
COMMUNITY POWER ACTORS AND CIVIL DEFENSE. A DELINEATION OF COMMUNITY POWER ACTORS AND AN ANALYSIS OF THEIR CIVIL DEFENSE ATTITUDES, KNOWLEDGE, BEHAVIOR, AND SOURCES OF INFORMATION.
Final rept.,
by Joe M. Bohlen, George M. Beal, Gerald E. Klonglan, and John L. Tait. 1965, 183p. Rept. no. rural Sociology-40
Contract OCD-PS-65-9
Unclassified report

Descriptors: (*Civil defense personnel, Leadership), (*Sociology, Civil defense systems), Attitudes, Behavior, Decision making, Power, Urban areas, Rural areas, Population, Public opinion, Fallout shelters, Statistical analysis, Tables, Iowa

A social power model is defined which may be used by the local civil defense director for analyzing social power in his community. The community members who have social power and affect the community decisionmaking process are designated as power actors. The power actors in five Iowa communities were interviewed. They were found to have similar personal and social characteristics. The power actors were perceived to have social power if the community was to build a community fallout shelter in the near future. The power actors' civil defense attitudes, knowledge, sources of information, and actions were analyzed. The power actors (1) had a low perception of threat, (2) perceived that we should have civil defense programs which (a) licenses, marks, and stocks existing buildings, (b) encourages the construction of individual family shelters, (c) makes available financial assistance for the construction of public shelter spaces in new public buildings, and (d) encourages communities or local governmental units to construct their own locally financed community shelters. (Author)

AD-623 943 Fld. 5/9, 15/3
CFSTI Prices: HC $1.00 MF $0.50
IOWA AGRICULTURAL AND HOME ECONOMICS EXPERIMENT STATION AMES
COMMUNITY POWER ACTORS AND CIVIL DEFENSE. A DELINEATION OF COMMUNITY POWER ACTORS AND AN ANALYSIS OF THEIR CIVIL DEFENSE ATTITUDES, KNOWLEDGE, BEHAVIOR, AND SOURCES OF INFORMATION.
Final summary rept.,
by Joe M. Bohlen, George M. Beal, Gerald E. Klonglan, and John L. Tait. 1965, 24p. Rept. no. rural Sociology-40S
Contract OCD-PS-65-9
Unclassified report

See also AD-623 918 for complete final report.

Descriptors: (*Civil defense personnel, Leadership), (*Sociology, Civil defense systems), Attitudes, Behavior, Decision making, Power, Urban areas, Rural areas, Population, Public opinion, Fallout shelters, Statistical analysis, Tables, Iowa

AD-623 944 Fld. 5/9
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
THE DEVELOPMENT OF TRAINING PROGRAMS FOR FIRST ENLISTMENT PERSONNEL IN ELECTRONICS MAINTENANCE MOS'S. II. HOW TO ANALYZE PERFORMANCE OBJECTIVES TO DETERMINE TRAINING CONTENT.
Research memo.,
by Arthur J. Hoehn. Jan 60, 82p.
Unclassified report

Availability: Reference only at DDC Hq after original copies exhausted. Not for sale.

Descriptors: (*Electronic technicians, Training), Maintenance personnel, Training devices, Learning, Job analysis, Teaching methods, Performance (Human), Handbooks

The report is the second of a series of guidance documents on the design and development of integrated school and OJT programs for first-term enlisted personnel in electronics maintenance positions. The document is concerned with the problem of: How analyzing performance requirements in order to define training content. The body of this paper is divided into two main parts: The first part consists of a statement of assumptions, concepts, and principles relating to the analysis of performance requirements; the second describes procedures for applying the conceptual framework with illustrative materials drawn from MOS 294 (Field Carrier Equipment Repairman).

AD-623 967 Fld. 5/9, 6/5, 6/19
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX FLIGHT NURSING BRANCH
CLINICAL ASPECTS OF AEROSPACE NURSING,
by Ellen M. Respini. 1965, 4p. SAM TR-65-221
Unclassified report

Prepared for presentation at Annual Scientific Meeting of the Aerospace Medical Association 27 Apr 65.

Availability: Published in Aerospace Medicine V36 N6 P545-8 Jun 1965. Copies to DDC users only.

Descriptors: (*Nurses, Space medicine), (*Space medicine, Nurses), Education, Space flight, Public health, Radiation hazards, Astronauts, Medical examination, Physical fitness, Diagnosis, Hospitals, Space stations

The study presents a critical evaluation of the place of the nursing profession in relation to the current state of aerospace medical investigation. It is determined that Clinical Aerospace Nursing can be categorized into four general areas of endeavor: (1) preventive and occupational health nursing, (2) adaptation to the numerous elements of by-products from aerospace investigation (usually termed 'fall-out'), (3) care of the person of the astronaut before and after flight and (4) anticipation of nursing problems to be encountered in the 0-g atmosphere of the space cabin. In order to attain proficiency in the four broad areas cited the nurse must be knowledgeable, if not proficient, in many disciplines such as physics, electronics, engineering and mathematics. She must find her way into the research laboratory and become a part of the team doing the experimentation that is to determine man's ultimate capability in space. In sum, she must acquire a creative, investigative attitude and the educational background to support that attitude. (Author)

AD-624 015 Fld. 5/9, 15/7
CFSTI Prices: HC $3.00 MF $0.75
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
TRAINING RESEARCH ON LOW ALTITUDE VISUAL AERIAL OBSERVATION: A DESCRIPTION OF FIVE FIELD EXPERIMENTS.
Research memo.,
by Francis H. Thomas, and Paul W. Caro,Jr.. Jul 62, 79p. Rept. no. humRRO-RM-8
Unclassified report

Descriptors: (*Aerial reconnaissance, Training), (*Target recognition, Aerial reconnaissance), (*Visual acuity, Aerial reconnaissance), Low altitude, Vision, Flight testing, Performance (Human), Achievement tests, Flight paths, Maps, Military personnel, Training devices, Display systems, Tables

The report discusses five field experiments conducted by the U. S. Army Aviation Human Research Unit, under Task OBSERVE. This Task was initiated in late 1957 in response to a request from the Department of the Army and the United States Continental Army Command to conduct research in aerial observation training. The purpose of the Task is to develop improved methods for training human air observers.

AD-624 048 Fld. 5/9
CFSTI Prices: HC $3.00 MF $0.50
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
A MODEL OF JUNIOR OFFICER JOBS FOR USE IN DEVELOPING TASK INVENTORIES.
Technical rept.,
by Harry L. Ammerman. Nov 65, 54p. Rept. no. tr-65-10
Contract DA-44-188-ARO-2 Proj. DA-2J024701A712-01
Unclassified report

Descriptors: (*Job analysis, Personnel management), (*Officer personnel, Job analysis), (*Army personnel, Job analysis), (*Personnel management, Job analysis), Decision making, Military training

A job description procedure was developed for use by Army service schools in identifying all of the tasks performed by junior officers in a job assignment. This procedure was based on a model of officer job behavior, illustrating the nature and sequence of tasks performed to attain specific goals within each area of responsibility. The behavior model was itself developed from considerations of existing job descriptions, the nature of job information typically provided by interviews with officers, and an information-processing view of purposive behavior. Application of the description technique to one officer job yielded 816 tasks covering troop leadership and unit management, as well as tactical and technical functions. General statements of work were effectively broken into task-level statements of job activities. The technique should provide a practical means for describing most supervisory and command jobs characterized by a high proportion of variable, nonroutine, and covert activities. (Author)

AD-624 059 Fld. 5/9
CFSTI Prices: HC $3.00 MF $0.50
DEPARTMENT OF THE ARMY WASHINGTON D C
MARGINAL MAN AND MILITARY SERVICE: A REVIEW (PART I)
Jan 65, 54p.
Unclassified report

Descriptors: (*Army personnel, Selection), English language, Education, Training, Aptitude tests, Military personnel

This is the first part of a two-part report about the usefulness in the Army of men classified as marginal. This first part is evaluative in nature. It examines the characteristic features and findings of many programs. There follows discussion of the advantages and disadvantages of the different procedures which have been used or which could apply. Eight principal programs or research studies furnished primary information upon which certain evaluations or conclusions made in this report are based. Six of these studies were conducted by the Army. They included one on basic education, two on Army school training and job performance of low scores on Armed Forces Qualification Test, one on moral marginals, one on a major proposal to research the whole spectrum of marginal manpower, and a final study which surveyed all previous major efforts.

AD-624 061 Fld. 5/9, 5/10
APPLIED PSYCHOLOGICAL SERVICES WAYNE PA
FACTORIAL CONGRUENCE IN CRITERION DEVELOPMENT,
by Arthur I. Siegel, and Mark G. Pfeiffer. 1965, 18p. Contract Nonr-2279 (00)
Unclassified report

Availability: Published in Personnel psychology V18 N3 P267-79 Autumn 1965. Copies to DDC only.

Descriptors: (*Personnel management, Applied psychology), (*Job analysis, Electronic technicians), (*Factor analysis, Psychometrics), Naval personnel, Aviation personnel, Supervisory personnel, Perception (Psychology), Training, Selection, Tables

Conclusions: (1) The job perceptions of the journeyman aviation electronics technician may be described in terms of four basic dimensions: (1) electrocomprehension, (2) equipment operation and inspection (routine), (3) electro-repair (simple), and (4) electro-safety. (2) These four dimensions seem 'congruent' with the basic perceptual dimensions extracted when aviation electronic technician supervisory personnel judged the 'journeyman' level job. (3) the job structure seems stable as judged from both the subordinate and the supervisory levels, thus increasing the referent generality of the findings. (4) A methodology for the establishment of the homogeneity and stability of performance criteria has been verified. (Author)

AD-624 062 Fld. 5/9, 5/10
CFSTI Prices: HC $1.00 MF $0.50
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
SELF-CONFRONTATION FOR COMPLEX SKILL TRAINING; REVIEW AND ANALYSIS.
Final rept., Apr-Dec 64,
by Herbert T. Eachus. Sep 65, 20p. Rept. no. amrl-TR-65-118
Proj. AF-1710 Task 171008
Unclassified report

Descriptors: (*Behavior, Training devices), (*Training devices, Behavior), Learning, Performance (Human), Feedback, Recall, Memory, Personality, Verbal behavior, Perception (Psychology), Training, Language, Culture, Television equipment, Sound motion picture projectors, State-of-the-art reviews

A review of the literature on self-confrontation and related phenomena was conducted to investigate the feasibility of their use as training techniques. The phenomenon of self-confrontation is the feedback of an individual's performance in a given situation through the use of videotape or sound motion picture film. This technique provides complete feedback of information and generates a situation in which subjects are quite amenable to modifications of their behavior, both verbal and nonverbal, with respect to given standards. The body of technical literature dealing with self-confrontation is small but complete enough to provide a basis for discussion of the phenomenon as a training technique. The analysis of the literature resulted in the recommendation for a research program to explore self-confrontation as a training technique for complex human skills. (Author)

AD-624 120 Fld. 5/9, 5/10
CFSTI Prices: HC $2.00 MF $0.50
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
A PRELIMINARY STUDY OF ACQUIRING CROSSCULTURAL INTERACTION SKILLS THROUGH SELFCONFRONTATION.
Final rept. Jul-Aug 64,
by Donald B. Haines, and Herbert T. Eachus.
Sep 65, 50p. Rept. no. amrl-TR-65-137
Proj. AF-1710 Task 171008
Unclassified report

Descriptors: (*Behavior, Military personnel), (*Training devices, Behavior), (*Culture, Military psychology), (*Military personnel, Public relations), Air force personnel, Officer personnel, Training, Armed forces (Foreign), Counterinsurgency, Performance (Human), Verbal behavior, Feedback, Television equipment, Learning

An experiment was carried out to assess the relative effectiveness of two methods of training USAF military advisors in cross-cultural skills. A scenario was constructed requiring subjects to play the role of an American USAF Captain who had to interact, in specified ways with a 'foreign counterpart,' a role played by an actor. A list of 34 behaviors appropriate to the situation and fictitious culture were provided the subject. The behaviors required ranged from actions, gestures, etc which were similar to those in our own society, to those which were considerably different. Twenty-three male subjects were divided into control and experimental groups and taught the desired behaviors by two methods: (1) Verbal coaching after a role-playing session (2) selfconfrontation by a videotape replay after a role-playing session. Considerable improvement resulted from these methods. The experiment confirmed the effectiveness of self-confrontation as a training technique for the rapid acquisition of complexand subtle skills of interaction - an area of difficulty encountered by USAF advisors on counterinsurgency training missions. (Author)

AD-624 142 Fld. 5/9
CFSTI Prices: HC $1.00 MF $0.50
NAVAL PERSONNEL RESEARCH ACTIVITY SAN DIEGO CALIF
THE EFFECTS OF CORRECTING EARLY FITNESS REPORTS FOR SITUATIONAL FACTORS.
Research rept.,
by William H. Githens, Bernard Rimland, and John H. Steinemann. Nov 65, 20p. Rept. no. srr-66-7
Proj. PF016060101
Unclassified report

Descriptors: (*Officer personnel, Psychometrics), (*Statistical data, Corrections), Analysis of variance, Errors, Selection, Factor analysis

The major purpose of the investigation was to determine the need for making statistical corrections to the fitness reports of junior officers to adjust for possible inequalities due to extraneous situational factors. The situational influences for which corrections were made were (a) type of duty stations at which reports were made, (b) number of reports (up to 5) the officer had received, (c) rater familiarity with the junior officer, as measured by the number of successive reports completed by the same rater. The analysis was conducted on the reports received during the first 18 months of active duty of 1,338 members of the NROTC graduating Class of 1959. The sample was fractionated into groups homogeneous with regard to the variables being studied. Standard scores were computed for each subgroup, and these were compared with raw, unstandardized average fitness scores for the total group. Although conducted in the process of developing a means of using early fitness reports as a research criterion, the findings of the study were encouraging in that they suggest the fitness report to be relatively uninfluenced by extraneous factors as used operationally. (Author)

AD-624 172 Fld. 5/9
HARVARD UNIV CAMBRIDGE MASS
A MEASURE OF PROGRAMING IN TEACHING-MACHINE MATERIAL,
by James G. Holland, and Frederick D. Kemp.
23 Feb 65, 7p. Contract AF19 (628)-2404 ESD TR-65-165
Unclassified report

Availability: Published in Journal of Educational Psychology V56 N5 P264-9 1965. Copies to DDC users only.

Descriptors: (*Teaching machines, Programmed instruction), (*Programmed instruction, Analysis), Effectiveness, Optimization, Errors

A quantitative measure was developed for the degree to which teaching-machine material is programed. This measure, the blackout ratio, is the percentage of words that can be obliterated in a program without influencing error rate. This measure was demonstrated with a program in which 69% of the words were removed without influencing error rate. (Author)

AD-624 227 Fld. 5/9
CFSTI Prices: HC $6.00 MF $1.50
NEW YORK UNIV N Y SCHOOL OF ENGINEERING AND SCIENCE
A CATALOG OF SIMULATORS FOR TRAINING SPACE FLIGHT PERSONNEL,
by Hayward Young. May 65, 267p. Rept. no. sete-210/83.1
Contract NObsr-89288 Proj. SETE ,SF-0131701 Task 5599

Unclassified report

Descriptors: (*Training devices, Simulators), (*Simulators, Catalogs), (*Astronauts, Training devices), Flight simulators, Space environmental conditions, Space simulation chambers, Space flight, Abstracts, Space crews, Control

The report is a compilation of short descriptions of ground-based simulators for the training of crew members or for research into the problems of crew operations and control of manned spacecraft. The simulators described belong to two general classes; (1) fixed or moving base representations of spacecraft crew compartments, and (2) devices used to expose a human subject to space flight related environments such as acceleration and pressure profiles, multi-axis rotations, and reduced gravity states. Some of these simulators provide for determining an astronaut's physiologic or psychologic reactions to phenomena of space travel. Also some are used to develop instrumentation and control systems for manned spacecraft and some are primarily research tools for the study of man's capabilities and requirements for future manned space missions.

AD-623 725 **See Fld. 5/1**

AD-623 784 **See Fld. 19/5**

AD-623 808 **See Fld. 6/14**

AD-623 908 **See Fld. 17/2**

5/10. PSYCHOLOGY (INDIVIDUAL AND GROUP BEHAVIOR)

AD-623 770 Fld. 5/10
CFSTI Prices: HC $1.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
OPTIMAL PROCEDURE FOR AN N-STATE TESTING AND LEARNING PROCESS. II.
Professional paper,
by W. Karush, and R. E. Dear. 18 Oct 65, 21p. Rept. no. sp-1922/001/00

Unclassified report

Descriptors: (*Learning, Mathematical models), (*Conditioned reflex, Probability), Optimization, Psychometrics, Decision theory, Functions

The paper is a continuation of work on optimal strategies for presentation of items in an N-trial learning experiment. In AD-611 056 and AD-610 696 it was shown (under certain assumptions) that the following decision rule generated an optimal sequencing: in any trial present the item for which the probability of being in the learned state is least. In the present paper it is shown that this rule is optimal for a more general learning model than any considered earlier; the new model allows for the possibility that a subject may respond incorrectly to a test on an item, even though he 'knows' the item. (Author)

AD-623 783 Fld. 5/10, 9/2
CFSTI Prices: HC $3.00 MF $0.75
CORNELL AERONAUTICAL LAB INC BUFFALO N Y
COMPUTER SIMULATION OF DRIVER BEHAVIOR DURING CAR FOLLOWING: A METHODOLOGICAL STUDY.
Final rept.,
by Myron L. Braunstein, Kenneth R. Laughery, and John B. Siegfried. Oct 63, 63p. Rept. no. CAL-YM-1797-H-1
Contract CPR-11-8686

Unclassified report

Descriptors: (*Behavior, Simulation), (*Motor vehicle operators, Behavior), Passenger vehicles, Performance tests, Flow charting, Reaction (Psychology), Perception (Psychology), Programming (Computers)

The applicability of complex information-processing computer models to the study of driver behavior was explored in a series of experimental and analytical studies. Verbal reports and objective performance measures were collected during controlled observations of car following on a four-lane limited-access highway. A model of the observed behavior was formulated in flow-chart form. The parameters of the model were examined and one parameter, threshold for a lead-car velocity change, was subjected to experimental study. The effects of rate and direction of velocity change and initial intervehicle separation were determined for three response measures. It was concluded that computer modeling is a feasible and useful approach to the study of driver behavior. Programming and testing of the current model, as well as additional experimental studies of the relevant parameters, is recommended. (Author)

AD-623 794 Fld. 5/10, 5/8
CFSTI Prices: HC $1.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
PROBING BEHIND THE HUMAN DECISION,
by Gerald H. Shure, and Robert J. Meeker. 7 Jul 65, 14p. Rept. no. sp-1698/001/00
Contract SD-286

Unclassified report

Prepared for presentation at Military Operations Research Symposium (15th), Norfolk, Va., 27-29 Apr 65.

Descriptors: (*Decision making, Man-machine systems), (*Man-machine systems, Decision making), Computers, Command + control systems, Perception, Game theory, Bargaining

A technique is described for the systematic collection of information about human decision making-information which has hitherto been untapped by existing datarecording and evaluation procedures and which holds promise of increasing the value of currently recorded action and decision data. The technique was developed initially to assist in the collection and interpretation of data in online computer studies of experimental game behavior. Sample findings from these studies and an analysis of decision process based on earlier studies are presented to demonstrate the potential feasibility and value of the proposed procedures for the evaluation of decision-making behavior in computer-based command and control systems. (Author)

AD-623 869 Fld. 5/10
CFSTI Prices: HC $4.00 MF $1.00
KANSAS STATE UNIV MANHATTAN DEPT OF PSYCHOLOGY
THE EVALUATION OF PERCEPTUAL FLAMES OF REFERENCE.
Technical repts.,
by William Bevan, and Harry Helson. Nov 65, 132p. Rept. no. tr-33-36
Contract Nonr-3634 (01)

Unclassified report

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Perception (Psychology), Environment), (*Environment, Perception (Psychology)), Confined environments, Reaction (Psychology), Behavior, Psychophysiology, Sensory perception, Visual perception, Auditory perception, Pitch discrimination, Sensory deprivation, Space perception, Color vision, Adaptation (Physiology), Attention, Illusions, Weightlessness, Emotions, Recall, Stimulation, Performance (Human)

Contents: Behavior in Unusual Environmental, by William Bevan, TR-33; Vision in the Ganzfeld, by Lloyd L. Avant, TR-34; Context and the Properties of Behavior, by William Bevan, TR-35; Changes in Response Latency Following Shifts in the Pitch of a Signal, by William Bevan, Russell A. Bell and Curtis Taylor, TR-36.

AD-623 936 Fld. 5/10, 6/19
CFSTI Prices: HC $1.00 MF $0.50
AIR FORCE MISSILE DEVELOPMENT CENTER HOLLOMAN AFB N MEX
BEHAVIOR OF THE CHIMPANZEE ON A COMPLEX MULTIPLE SCHEDULE,
by Richard E. Belleville, Frederick H. Rohles,Jr., and Marvin E. Grunzke. Aug 61, 24p. Rept. no. afmdc-TR-61-27
Proj. AF-6893 Task 68930 ,68931

Unclassified report

Descriptors: (*Chimpanzees, Behavior), (*Behavior, Confined environments), (*Space simulation chambers, Chimpanzees), Space flight, Life support, Conditioned reflex, Stimulation, Training, Display systems

The report describes chimpanzee behavior on a four component, three lever multiple schedule. The component schedules included the Sidman avoidance procedure with a concurrent discriminated avoidance feature on a second lever, fixed ratio performance for food, differential reinforcement of low rate for water requiring a dual response chain, and a symbol discrimination task for continuous food reinforcement using three levers. The advantages of employing this type of schedule for evaluating the effects of exposure to space flight conditions are discussed. (Author)

AD-623 976 Fld. 5/10
CFSTI Prices: HC $1.00 MF $0.50
COLBY COLL WATERVILLE MAINE
EFFECT OF COMBINATIONS OF SIX PRESENTATION CONDITIONS ON THE DURATION OF THE SPIRAL AFTEREFFECT,
by James L. Fozard, Margaret Fuchs, Marsha Palmer, and Allan M. Smith. 1965, 17p. Contract NSF-G22836

Unclassified report

Descriptors: (*Vision, Afterimages), Psychophysiology, Stimulation, Motion, Rotation, Reaction (Psychology), Adaptation (Physiology), Eye, Males, Females, Statistical analysis

Using the stationary spiral itself as a test object 8 ft. from S, the duration of the spiral aftereffect was measured in three experiments which varied diameter, direction and speed of rotation of spiral, inspection time, number of turns and relative proportion of black and white. Duration of the aftereffect increased as number of turns of the spiral increased from 1.5 to 3.5, as inspection time increased from 15 - 120 sec. and as the relative width of light and dark bands decreased from 1:5 to 5:1. The aftereffect was longer with the expanding condition than with the contracting one. It decreased as spiral diameter changed from 4 or 8 to 16 in. corresponding to changes in visual angle ranging from 2 degrees to 9 degrees. Speeds of 25, 100 and 250 RPM did not produce significant differences although an interaction was found between speed and number of turns. (Author)

AD-624 011 Fld. 5/10, 6/5
OSLO UNIV (NORWAY) NEUROPHYSIOLOGICAL LAB
IMPAIRED ACQUISITION OF PASSIVE AVOIDANCE BEHAVIOR BY SUBCALLOSAL, SEP-

TAL, HYPOTHALMIC, AND INSULAR LESIONS IN RATS,
by Birger R. Kaada, E. Wulff Rasmussen, and Olay Kveim. 8 Aug 61, 10p. Contract AF61 (514)-1127 AFOSR 2742

Unclassified report

Availability: Published in Journal of Comparative and Physiological Psychology V55 N5 P661-70 1962. Copies to DDC users only.

Descriptors: (*Psychophysiology, Behavior), (*Behavior, Brain), (*Brain, Damage), Cerebral cortex, Inhibition, Motor reactions, Conditioned reflex, Reaction (Psychology), Electric currents, Central nervous system, Thalamus, Nervous system, Physiology, Rats, Norway

The present results are based on the study of 191 brain lesioned rats and 24 normal control animals. The various lesions involve: a variety of cortical areas, the septal nuclei, hippocampus, fornix, corpus callosum, thalamic, preoptic, and anterior hypothalamic regions. A behavioral test measured the water-deprived animals' ability to passively avoid shock by not drinking from an electrified water source. The main conclusions are: (1) Passive avoidance behavior is deficient following bilateral lesions of subcallosalseptal-preoptic area, the anterior hypothalamus, and thalamus. (2) Bilateral neocortical lesions depress passive avoidance behavior when insular cortex is involved in the damage. (3) The behavioral effect of the lesions is interpreted as representing the animals' inability to inhibit the relevant approach response. The implicated areas have already been shown by stimulation to have somatomotor inhibitory functions. (4) Alternate explanations of the findings are considered and tentatively rejected. (Author)

AD-624 012 Fld. 5/10
DELAWARE UNIV NEWARK CENTER FOR RESEARCH ON SOCIAL BEHAVIOR
MOTIVATIONAL AND PERCEPTUAL EFFECTS IN ORIENTATION TOWARD A NEWCOMER,
by Robert C. Ziller, and Richard D. Behringer.
8 Oct 63, 14p. Contract AF-AFOSR-62-95 Proj. AF-9778 Task 977802
AFOSR 65-1582

Unclassified report

Availability: Published in Journal of Social Psychology V66 P79-90 1965. Copies to DDC users only.

Descriptors: (*Group dynamics, Recall), (*Motivation, Perception (Psychology)), (*Perception (Psychology), Group dynamics), Culture

Two laboratory experiments are reported which analyze the regular group-member's reaction to the advent of an imminent newcomer under varying characteristics of the host group, the host-group members, and the new member. Recall of biographical information concerning the imminent newcomer serves as the dependent variable. The first experiment concerned the relationship of high and low achievement-motivation members and Negro-White newcomers to interest in the newcomer. It was found that more information was recalled about the White than about the Negro newcomer. The results are interpreted as supporting Allport's theory of prejudice toward Negroes: that the race category tends to be overgeneralized, thereby rendering further information search less salient. The second experiment was designed to study in a more systematic fashion the effects of need achievement on recall of biographical data of a Negro or White newcomer under conditions of varying group size. All three independent variables were found to be related to recall, but the effects were interactional. (Author)

AD-624 034 Fld. 5/10
CFSTI Prices: HC $4.00 MF $1.00
ILLINOIS UNIV URBANA DEPT OF PSYCHOLOGY
EFFECTS OF TASK CHARACTERISTICS ON GROUP PROCESS.
Technical rept.,
by Charles G. Morris,II.. Jul 65, 134p. Rept. no. tr-2
Contract AF49 (638)-1291 Proj. AF-9779 Task 977902
AFOSR 65-1519

Unclassified report

Descriptors: (*Job analysis, Group dynamics), (*Group dynamics, Job analysis), Leadership, Creativity, Problem solving

The study is a laboratory investigation of the effects on group interaction and leader behavior of two group task characteristics: task 'type' (production, discussion, problem solving) and level of task difficulty (high, medium, low). Incidental evidence on the effects of the ordinal position of tasks is presented. Results show that task type significantly affects the distribution of more than 60% of the group or leader activity. Level of task difficulty does not greatly affect group or leader activity. Ordinal position significantly differentiates the first task from the other three. Methodological implications of the study are discussed. (Author)

AD-624 035 Fld. 5/10
CFSTI Prices: HC $4.00 MF $0.75
HEBREW UNIV JERUSALEM (ISRAEL) DEPT OF PSYCHOLOGY
CORRELATES OF AMBIVALENCE, RISK-TAKING AND RIGIDITY.
Scientific rept.,
by A. Minkowich. 1 Aug 65, 101p. Rept. no. sr-2
Contract AF-EOAR-21-64 Proj. AF-9778 Task 9778-01
AFOSR 65-1700

Unclassified report

Descriptors: (*Decision making, Psychometrics), Emotions, Personality, Attitudes, Behavior, Israel, Performance tests

Problems of assessing ambivalence and risk-taking tendencies, and the exploration of their interrelations within a theoretical framework of decision-making behavior were investigated. An attempt was made to interpret within this framework the demonstrated relationships between ambivalence and risk-taking tendencies and the following variables: perceptual rigidity, intolerance of ambiguity, field dependence, dogmatism, anxiety and socialization experiences during childhood. Ambivalence was demonstrated as a generalized trait and was correlated with punitive parental socialization, with anxiety, field dependence, intolerance of ambiguity and low risk of prestige. Experimentally induced guilt resulted in a decrease of ambivalence. Marked sex differences were found for the relationships of ambivalence with financial risk and with styles and content sensitivities in binocular resolutions. (Author)

AD-624 052 Fld. 5/10
CFSTI Prices: HC $1.00 MF $0.50
BUCKNELL UNIV LEWISBURG PA
CONFORMITY BEHAVIOR AND NEED FOR AFFILIATION.
Technical rept.,
by Paul E. McGhee, and Richard C. Teevan.
1965, 10p. Rept. no. tr-16
Contract Nonr-3591 (01) Proj. NR-171-803

Unclassified report

Prepared in cooperation with Ohio State Univ., Columbus.

Descriptors: (*Group dynamics, Motivation), (*Behavior, Motivation), Visual perception, Social psychology

Eighty male high school juniors and seniors participated in a conformity experiment, using a modified version of the Crutchfield (1955) apparatus. The investigation studied the relationship between conformity behavior and affiliative motivation. The Ss, of varying need for affiliation (n Aff), were subjected to a simulated group pressure situation in which each S was asked for his judgment of a given perceptual problem in the face of four earlier erring, but unanimous, judgments. A conformity response was defined as yielding to this erring majority on those slides which all Ss in a pretest were able to answer correctly. The results indicated that high n Aff Ss conform significantly more than low in Aff Ss. (Author)

AD-624 174 Fld. 5/10
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS LAB OF AVIATION PSYCHOLOGY
PREDICTION ON THE BASIS OF CONDITIONAL PROBABILITIES,
by William C. Howell, and Joseph F. Funaro.
1965, 12p. Contract AF33 (657)-11718 ,AF33 (615)-2248 Proj. AF-7184 Task 718403
AMRL TR-65-162

Unclassified report

Availability: Published in Journal of Experimental Psychology V69 N1 P92-9 Jan 1965.

Descriptors: (*Probability, Learning), (*Learning, Probability), Behavior, Performance (Human), Psychometrics, Stimulation, Statistical analysis

Two-choice prediction behavior was studied for a task in which outcome probabilities were conditional upon values of the stimuli. S was required to guess which of 2 meter readings would be higher given one as a stimulus; readings were drawn in pairs from 2 separate distributions. 4 groups of Ss made 100, 300, 500, or 700 predictions, following which they judges distribution means and various probabilities associated with the readings. Asymptotic prediction frequencies did not match conditional probabilities even though judgments were surprisingly accurate. Prediction functions suggest that S establishes cutoff points for each stimulus distribution beyond which he chooses the alternative meter. Empirical cutoff data support this interpretation suggesting, further, that the location of cutoff points approaches the distribution means as knowledge is gained over trials. (Author)

AD-624 204 Fld. 5/10
CFSTI Prices: HC $4.00 MF $1.00
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
SOME DETERMINANTS OF SMALL-GROUP EFFECTIVENESS.
Research memo., rev. ed.,
by Clay E. George. Oct 62, 125p.

Unclassified report

Revision of manuscript submitted May 62.

Descriptors: (*Group dynamics, Effectiveness), Problem solving, Leadership, Performance (Human), Stress (Psychology), Motivation, Personality, Behavior, Attitudes, Perception (Psychology), Reaction (Psychology), Sociometrics, Military psychology, Social psychology, Reviews

The paper represents an attempt to derive from the literature on small groups some notion of the variables underlying the effectiveness of groups in resolving complex and difficult problems. Major emphasis has been placed on studies published between 1955 and 1962. Five sections comprise the body of the paper. The first three deal with background material, the last two with group structure and process per se. The role of cognitive variables in group performance is considered in Section I; the problem of group code orientations is taken up in Section II. Group motivation and behavior under pressure are discussed in Section III. Finally, in Sections IV and V, these variables are considered from the standpoint of their interactions with such group process variables as code formation, social power, information flow, and conformity, and with such structural variables as

clique hierarchies, cohesion, formal status and leadership, and communication networks.

AD-623 725 **See Fld. 5/1**

AD-623 774 **See Fld. 5/9**

AD-623 775 **See Fld. 5/9**

AD-623 809 **See Fld. 6/3**

AD-623 814 **See Fld. 6/3**

AD-624 044 **See Fld. 6/19**

AD-624 061 **See Fld. 5/9**

AD-624 062 **See Fld. 5/9**

AD-624 120 **See Fld. 5/9**

AD-624 144 **See Fld. 6/19**

AD-624 151 **See Fld. 6/18**

5/11. SOCIOLOGY

AD-624 161 Fld. 5/11, 15/3
CFSTI Prices: HC $3.00 MF $0.75
PITTSBURGH UNIV PA DEPT OF SOCIOLOGY
ATTITUDES TOWARD CIVIL DEFENSE: AN EXAMINATION OF THE ATTRIBUTION OF MAXIMUM APPROVAL,
by J. Elliot Seldin. Oct 65, 82p. Contract OCD-OS-63-48 Task 4812B

Unclassified report

Descriptors: (*Civil defense systems, Public opinion), (*Public opinion, Civil defense systems), Attitudes, Leadership, Cold war, Fallout shelters, Siciology, United States, Sampling, Statistical data, Population, Tables

The objective of the paper is to examine the attitudes toward Civil Defense that the American public attributes to various groups and individuals. We find that a sample of the American public believes that all the groups and individuals we ask about in our study feel favorably toward Civil Defense. However, some groups are much more frequently cited as favoring Civil Defense than others. The respondents' personal feelings toward Civil Defense are also high favorable. Thus, although there is variation in attribution patterns dependent upon the group to which the attributions are made and there exist differences in the personal feelings of respondents, most people support Civil Defense and most people believe that a wide range of groups and individuals support Civil Defense. Given these general results, we find that attribution patterns also vary according to the population characteristics of respondents (e.g., age, sex, income, etc.) and the personal attitudes of respondents (the more favorable one is toward Civil Defense, the more likely he is to believe others to be favorable). Finally, the influence of personal favorability upon attributions is mediated by population characteristics. Holding favorability constant, attribution patterns vary according to the particular population characteristics of respondents. (Author)

6/1. BIOCHEMISTRY

AD-624 070 Fld. 6/1
SINAI HOSPITAL OF BALTIMORE MD BIOCHEMISTRY RESEARCH DIV
LIPID COMPOSITION OF HEART MUSCLE HOMOGENATE,
by L. W. Wheeldon, Z. Schumert, and D. A. Turner. 12 Jan 65, 9p. Contract Nonr-2424(01), Grant PHS-H-5283

Unclassified report

Availability: Published in Journal of Lipid Research V6 P481-9 Oct 1965. Copies to DDC users only.

Descriptors: (*Lipids, Heart), (*Heart, Lipids), Mitochondria, Microsomes, Phospholipids, Fatty acids, Cholesterol, Coenzymes, Cytochrome oxidase, Carboxylic ester hydrolases, Proteins, Ribonucleic acids, Desoxyribonucleic acids, Bovines

Using cytochrome oxidase and esterase assays as a guide, mitochondria and microsomes were prepared from ox heart homogenate with about 25% cross-contamination of phospholipid. By the same criteria, the lipid complement of well washed myofibrils was essentially microsomal in origin. Approximately 60% of the phospholipid of the whole homogenate was found to be associated with microsomes, about half of this being firmly bound to myofibrils. Mitochondrial lipids were characterized by a higher degree of unsaturation of the free fatty acids and higher contents of cardiolipin, cholesterol, and coenzyme Q than in microsomes, where choline-containing phospholipid, especially sphingomyelin, formed a greater proportion of the total phospholipid than in mitochondria. The outstanding difference was the virtual localization of ethanolamine plasmalogen in microsomes, in contrast to the equal distribution of choline plasmalogen between mitochondria and microsomes. Myofibril lipids resembled more closely microsomal than mitochondrial lipids, but contained in addition phosphatidyl serine and phosphoinositide, which were not detected in mitochondria and microsomes. (Author)

AD-624 074 Fld. 6/1
CFSTI Prices: HC $1.00 MF $0.50
STANFORD UNIV CALIF DEPT OF GENETICS
BIOLOGICAL APPLICATIONS OF MASS SPECTROMETRY.
Final rept., 1 Mar-30 Jun 65,
by J. Lederberg, and E. Levinthal. 1 Aug 65, 17p. Rept. no. irl-1030
Contract AF49 (638)-1599 Grant ,AF-AFOSR-886-65 Proj. AF-9777 Task 9777-01
AFOSR 65-1632

Unclassified report

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Mass spectroscopy, Amino acids), (*Gas chromatography, Amino acids), Peptides, Data processing systems, Optical properties, Ion bombardment

A review is presented of an investigation on the applications of the mass spectrometer to biological research. The mass spectra of the amino acids is examined as well as the spontaneous cyclization of oligopeptides, the optical activity of amino acids, logarithmic recording of the mass spectral data, computer methods and other techniques of analysis, and the heavy particle bombardment of biochemical materials. Included is an article on the optical resolution of D, L amino acids by gas chromatography and mass spectrometry. The use of mass spectrometry is shown for the radio detection of D and L input reagents, as well as to identify the optically active species. (Author)

AD-624 212 Fld. 6/1
CHILDREN'S HOSPITAL WASHINGTON D C BIOCHEMICAL RESEARCH LAB
THE DETERMINATION OF TERMINAL PROTEIN-BOUND FUCOSE,
by G. Gyorky, and J. C. Houck. 9 Jun 65, 6p.
Contract PHS-AM-08168 Proj. NR-105-325

Unclassified report

Availability: Published in Canadian Journal of Biochemistry V43 P1806-11 1965. Copies to DDC users only.

Descriptors: (*Carbohydrates, Chemical analysis), (*Glycoproteins, Chemical analysis), Chromatographic analysis, Absorption spectrum

The spectrophotometric determination of protein-bound fucose is badly compromised by spurious chromagens developed from protein degradation products. To minimize the contribution of these spurious products to the color yield of fucose, the glycoprotein was partially hydrolyzed in dilute acid, thus releasing the terminal carbohydrate from the protein moieties, and the residual protein was removed with trichloroacetic acid. That the fucose content of this supernatant was real was confirmed by paper chromatography and spectral studies. The spurious chromagens were shown to result from the interaction of protein degradation products and galactose. (Author)

AD-623 972 **See Fld. 7/4**

AD-624 069 **See Fld. 6/13**

AD-624 104 **See Fld. 6/13**

AD-624 209 **See Fld. 6/2**

6/2. BIOENGINEERING

AD-623 951 Fld. 6/2
CFSTI Prices: HC $4.00 MF $0.75
PHILCO CORP WILLOW GROVE PA BIOCYBERNETICS LAB
MYOPOTENTIAL RESPONSE AND THE FORCE OF MUSCLE CONTRACTION.
Final rept.,
by F. Ray Finley, and R. W. Wirta. 1 Nov 65, 118p. Rept. no. philco-2386
Contract Nonr-4292 (00)

Unclassified report

See also AD-613 930.

Descriptors: (*Muscles, Electrophysiology), (*Musculoskeletal system, Biophysics), Joints (Physiology), Arms, Contraction, Motor reactions, Performance (Human), Neuromuscular transmission, Force (Mechanics), Prosthetics, Man-machine systems, Adaptation (Physiology), Graphics

The report correlates myopotential response to varying degrees of muscular exertion and describes the incidence and extent of variability. The scope of the study included the effect of five different loads on six muscle sites in both elbow and shoulder flexion. The data were rendered into tables and into position-torque charts called isomyols. (Author)

AD-623 969 Fld. 6/2, 9/6
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX
MEASUREMENT, PROCESSING, AND CONTROL OF TELEMETERED BIOLOGICAL ANALYSES FOR TERRESTRIAL AND AEROSPACE APPLICATIONS,
by William G. Glenn, Wesley E. Prather, and Heinz A. Jaeger. 8 Feb 65, 8p. Rept. no. sam-TR-65-312
Proj. AF-7754 Task 775402

Unclassified report

Availability: Published in Preprint 1.2-2-65 Instrument Society of America, Annual ISA Conference and Exhibit (20th), 4-7 Oct 65, Los Angeles, Calif. Copies to DDC users only.

Descriptors: (*Telemeter systems, Space medicine), (*Space medicine, Telemeter systems), (*Data processing systems, Telemetering data), (*Antigen-antibody reactions, Monitors), Data transmission systems, Control systems, Multiple operation, Magnetic recording systems, Information retrieval

Three subcarriers (1.3, 1.7, 3.0 kc.) are transmitted from a modified Bio-telescanner as it measures several characteristics of biological (antigen-antibody) reactions. Six kinds of information from

these three subcarriers are received by a new console named TELUS (Telemetric Universal Sensor). TELUS receives, quantitates, codes, searches, retrieves, transmits, and distributes these data which are simultaneously stored on magnetic tape with accompanying binary coded decimals. The entire system can be operated by one man who measures, processes, and controls incoming or previously taped biological analyses. (Author)

AD-624 209 Fld. 6/2, 6/1
CALIFORNIA UNIV LOS ANGELES DEPT OF ZOOLOGY
SUCCINATE UTILIZATION BY EUGLENA: COMPARISON OF GROWTH ON LOW LEVELS OF SUCCINATE, ACETATE AND ETHANOL,
by Blaine H. Levedahl, and B. W. Wilson. 15 Dec 64, 8p. Contract Nonr-233 (39) Proj. NR-120 336
Unclassified report

Availability: Published in Experimental Cell Research V39 P242-8 1965. Copies to DDC users only.

Descriptors: (*Microrganisms, Culture media), (*Succinates, Metabolism), (*Growth, Microorganisms), Algae, Protozoa, Acetates, Ethanols, Concentration (Chemistry), Cells (Biology), pH, Population

The ability of Euglena gracilis var. bacillaris (streptomycin-bleaced)to form cell mass from three different carbon sources at low concentation levels has been investigated. When cells were grown on the three carbon sources-succinate, acetate, and ethanol-the final cell populations were proportional to the initial carbon source concentration from 1.0 to 5.0 mM at 24.5C as would be expected if the growth were limited by the concentration of the carbon source. On the basis of the dry weight of material formed, ethanol was the most effective substrate for growth. Acetate was onehalf as effective and succinate was approximately onethird as effective as ethanol. The division rates of Euglena do not vary in the same order as the dry mass production on the different carbon sources. The rate of increase of cell number is higher on acetate than on ethanol or succinate. The peak population obtained per micromole of added carbon source is dependent upon the pH of the medium for both succinate and acetate with more cells produced in acid media than in neutral. The number of cells per micromole of ethanol is relatively independent of pH in the range studied. (Author)

6/3. BIOLOGY

AD-623 791 Fld. 6/3
CFSTI Prices: HC $1.00 MF $0.50
LONDON UNIV (ENGLAND) INST OF LARYNGOLOGY AND OTOLOGY
ENERGY TRANSFORMATION WITHIN THE INNER EAR.
Final rept.,
by D. F. N. Harrison. Jun 65, 6p. Contract AF-EOAR-47-64 AFOSR 65-1603
Unclassified report

Descriptors: (*Otorhinolaryngology, Animals), Ear, Throat, Anatomy, Physiology, Histology, Bats, Rodents, Birds

Most of the material collected during overseas expeditions has now been processed but not completely examined. Further specimens are being prepared. Emphasis is still on the cochlea and larynx of Chiroptera and Rodentia but work has been started on an examination of the avian syrinx. Computer facilities have been used for the best possible correlation between anatomical structure variations and function. (Author)

AD-623 805 Fld. 6/3
MAX-PLANCK-INSTITUT FUR BIOLOGIE TUBINGEN (GERMANY)
INFORMATION PROCESSES IN BIOLOGICAL SYSTEMS.
Final rept.,
by W. E. Reichardt. 31 Mar 65, 9p. Contract AF-EOAR-45-64 AFOSR 65-1530
Unclassified report

Availability: Reference only at DDC Hq after original copies exhausted. Not for sale.

Descriptors: (*Arthropods, Vision), (*Vision, Arthropods), Eye, Musca, Drosophila, Hymenoptera, Humans, Visual perception, Mutations, Reflexes, Motion, Light, Brightness, Adaptation (Physiology), Contraction, Stimulation, Nerve cells, Morphology (Biology)

Contents: Anatomically and physiologically determined visual fields of ommatidia in the complex eye of the fly Musca; Optical transfer properties of the compound eyes in Drosophila; Motion perception of the fruitfly Drosophila; Human pupillary light reflex to sinusoidally changing brightness densities; Mechanoreceptors in the cuticle of the honey bee.

AD-623 809 Fld. 6/3, 5/10
CFSTI Prices: HC $1.00 MF $0.50
MAX-PLANCK-INSTITUT FUER VERHALTENSPHYSIOLOGIE ERLING-ANDECHS (WEST GERMANY)
ENTRAINMENT OF CIRCADIAN RHYTHMS BY ZEITGEBERS.
Final rept.,
by J. Aschoff. 16 Jul 65, 4p. Contract AF-EOAR-68-64 Proj. AF-9777 Task 977701 AFOSR 65-1564
Unclassified report

Descriptors: (*Birds, Diurnal variations), Light, Behavior, Time, Analysis of variance

A summary is presented of a study of the diurnal rhythmicity of perch-hopping in finches kept in artificial light-dark cycles. It is found that with an increase of lighttime, the activity-time of the bird increases. The phase angle difference, measured between midpoint of activitytime and midpoint of the light-cycle, follows the circadian rule, becoming more positive with an increase in lighttime. The results are in agreement with three rules describing the activity cycles of wild birds in the field at different seasons. (Author)

AD-623 814 Fld. 6/3, 5/10
CFSTI Prices: HC $1.00 MF $0.50
COMMUNICATION RESEARCH INST MIAMI FLA
COMMUNICATION STUDIES ON TURSIOPS TRUNCATUS.
Final rept. 1 Jan-30 Nov 64,
by John C. Lilly. 30 Nov 64, 6p. Contract AF-AFOSR-415-63 AFOSR 65-1602
Unclassified report

See also AD-431 850.

Descriptors: (*Cetacea, Verbal behavior), (*Speech, Learning), Behavior, Humans, Marine biological noise, Sound, Phonetics

During the year 1964 concentrated efforts were made in two directions: (1) the testing of the ability of Tursiops truncatus to reproduce the sounds of human speech and to respond vocally appropriately to a human dictating various kinds of materials to the dolphin. (2) The studies on the natural phonation capabilities of Tursiops truncatus were continued. (Author)

AD-624 043 Fld. 6/3
CFSTI Prices: HC $1.00 MF $0.50
CORNELL UNIV ITHACA N Y DEPT OF ZOOLOGY
TEMPERATURE REGULATION IN THE VAMPIRE BAT DESMODUS ROTUNDUS,
by Charles P. Lyman, and William A. Wimsatt. Sep 65, 19p. Contract AF41 (609)-2296 Grant ,NSF-G-24043 Proj. AF-8237 Task 823703 AAL TR-64-36
Unclassified report

Descriptors: (*Bats, Body temperature), Hibernation, Hypothermia, Oxygen consumption, Temperature, Metabolism, Blood, Tolerances (Physiology)

Body temperature and oxygen consumption were measured at various environmental temperatures in a series of captive and wild caught vampire bats, Desmodus rotundus. The response to changes in ambient temperatures was unpredictable and could not be correlated with the age or sex of the animals, their nutritional condition, or the length of their captivity. Body temperature varied greatly, but generally did not fall below 30C when the ambient temperature was above 25C. At lower ambient temperatures, some bats increased their metabolism and maintained a high body temperature for varying periods, while others showed little or no increase in metabolic rate, and their body temperatures declined. Below about 20C body temperature, bats were unable to rewarm themselves without exogenous heat. Calculations indicate that vampires did not drink sufficient blood to maintain a homeothermic condition at the temperatures of temperate zone hibernacula. Bats could tolerate ambient temperatures of 33C or more for only short periods. It is suggested that Desmodus is limited from spreading northward because of its inferior temperature regulation. (Author)

AD-624 159 Fld. 6/3
CFSTI Prices: HC $1.00 MF $0.50
MARYLAND UNIV COLLEGE PARK DEPT OF ZOOLOGY
CURRENT REFERENCES IN MEDICAL ENTOMOLOGY FROM RUSSIAN, CENTRAL AND EASTERN EUROPEAN AND CHINESE LITERATURE, VOLUME IV, NO. 11,
by Alena Elbl. 1965, 23p. Contract DA-49-193-MD-2238 TT 65-64593
Unclassified report

Descriptors: (*Disease vectors, Indexes), (*Insects, Disease vectors), Ticks, Mites, Diptera, Siphonaptera, Lice, Mites, Bacteria, Spirochaeta, Protozoa, Rickettsia, Virus diseases, Pest control, Insect control, Diseases, Epidemiology, USSR, Eastern Europe, China

AD-624 160 Fld. 6/3
CFSTI Prices: HC $3.00 MF $0.50
MARYLAND UNIV COLLEGE PARK DEPT OF ZOOLOGY
INDEX CATALOGUE TO RUSSIAN, CENTRAL AND EASTERN EUROPEAN, AND CHINESE LITERATURE IN MEDICAL ENTOMOLOGY. VOLUME VIII. RICKETTSIAL DISEASES,
by Alena Elbl. 1965, 56p. Contract DA-49-193-MD-2238 TT 65-64594
Unclassified report

See also AD-722 210.

Descriptors: (*Disease vectors, Indexes), (*Rickettsia, Diseases), Epidemiology, Parasites, Infectious diseases, Lice, Ticks, Mites, Arthropods, Rodents, Hemiptera, Insects, Coxiella, Rickettsia tsutsu gamushi, USSR, Eastern Europe, China

The references are arranged alphabetically by author according to each specific disease mentioned while a list of references dealing in a non-specific way with arthropod borne rickettsioses is appended. (Author)

AD-624 106 See Fld. 6/5

6/4. BIONICS

AD-623 778 Fld. 6/4, 9/4
CFSTI Prices: HC $1.00 MF $0.50
CRUFT LAB HARVARD UNIV CAMBRIDGE MASS

ON THE ABSTRACTION PROBLEM IN PATTERN CLASSIFICATION.
Technical rept.,
by Yu-Chi Ho, and Colin Blaydon. Aug 65, 17p.
Rept. no. tr-476
Contract Nonr-1866 (16) Proj. NR-372-012
Unclassified report

Descriptors: (*Pattern recognition, Classification), (*Geometric forms, Classification), Algorithms, Probability, Functions, Stochastic processes

An algorithm is presented which, utilizing the given samples of the 2 class A and B, converges to the expression p (A/x), the probability that the given sample x belongs to class A. (Author)

AD-623 758 **See Fld. 9/2**

AD-623 924 **See Fld. 9/2**

AD-624 152 **See Fld. 9/2**

6/5. CLINICAL MEDICINE

AD-623 798 Fld. 6/5, 6/16
CFSTI Prices: HC $3.00 MF $0.75
CLEVITE CORP BEDFORD OHIO PIEZOELECTRIC DIV
BRAIN STEM SYSTEMS AND BEHAVIOR.
Final scientific rept.,
by Cesare Bartorelli, and Alberto Zanchetti. 31 May 65, 59p. Contract AF-EOAR-41-64
AFOSR 65-1579
Unclassified report

Descriptors: (*Sleep, Electroencephalography), (*Nervous system, Sleep), (*Blood pressure, Sleep), (*Behavior, Sleep), Brain, Emotions, Reflexes, Blood circulation, Nerve cells, Nerve fibers, Physiology, Thresholds (Physiology), Cerebral cortex, Inhibition, Stimulation, Cats, Italy

The objectives of the research were to compare reflex regulation of waking and emotional behaviors; to identify the pontine centers of deep sleep and their pathways; and to study reflex regulation of circulation during sleep. (Author)

AD-623 813 Fld. 6/5
CFSTI Prices: HC $4.00 MF $0.75
PUBLIC HEALTH SERVICE WASHINGTON D C DIV OF HEALTH MOBILIZATION
SHELTER POPULATION HEALTH STATUS STUDY.
Final rept.
Dec 65, 106p. Contract OCD-OS-62-100 Proj. OCS-1221A
Unclassified report

Descriptors: (*Public health, Shelters), (*Shelters, Public health), Nuclear warfare casualties, Cardiovascular diseases, Digestive system diseases, Wounds + injuries, Respiratory diseases, Infectious diseases, Parasitic diseases, Mental disorders, Mortality rates, Hospitals, Hygiene, Management planning, Population, United States, Statistical analysis

The study shows the nature and extent of chronic, acute and incapacitating conditions in the national population which will be affected by adverse shelter environmental factors. It was undertaken to indicate the nature and extent of such conditions which may be expected in the shelter population and to help emergency planners prepare shelters with adequate supplies, equipment, facilities and personnel to insure the best possible health of all persons. (Author)

AD-623 894 Fld. 6/5, 6/15
CFSTI Prices: HC $1.00 MF $0.50
WASHINGTON UNIV SEATTLE DEPT OF NEUROLOGICAL SURGERY
EXPERIMENTAL CONCUSSION.
Final rept.,
by Arthur A. Ward,Jr.. 1965, 3p. Contract Nonr-3576 (00) Proj. NR-101-127
Unclassified report

Descriptors: (*Brain, Wounds + injuries), Mental disorders, Pathology, Central nervous system, Sensory perception, Cerebral cortex, Electrophysiology, Nerve cells, Acetylcholine, Atropine, Parasympatholytic agents, Scopolamine, Nervous system, Physiology, Surgery

The goal of the investigation was to study the physiological alternations of central nervous system activity which accompany concussion in the effort to understand the genesis of coma and the associated pathophysiological changes which underly this phenomenon. The matter was studied in monkeys following acceleration concussion. It was found that evoked potentials recorded in the lateral sensory pathways are not altered during the coma associated with concussion. On the other hand, responses in the reticular activating system of the brain stem evoked by afferent stimulation are markedly attenuated or abolished by concussion. The spontaneous electrical activity of the cerebral cortex, as well as certain subcortical regions, was also monitored during and following concussion, and it was demonstrated that changes in cortical activity were, in general, surprisingly minimal in view of the massive changes in physiological function. In the majority of instances, a generalized flattening of the record appeared immediately after the blow followed by some slow way of activity with return to control levels in periods ranging from ten minutes to several hours. In subcortical regions the electrical activity paralleled that seen in the cortex.

AD-623 965 Fld. 6/5
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX
PATHOGENESIS OF EMPHYSEMA: EXPERIMENTAL OBSERVATIONS,
by Robert G. Rossing, and James R. Clay. 1965, 7p.
Unclassified report

Availability: Published in Diseases of the Chest V48 N3 P255-61 Sep 1965.

Descriptors: (*Respiratory diseases, Etiology), Pathology, Bronchi, Phosgene, Toxicity, Obstruction (Physiology), Histology, Dogs

Factors which have been suggested as being of importance in the development of emphysema are discussed and several schemes of pathogenesis composed of various combinations of these factors are reviewed. Recurrent exposure of dogs to sublethal concentration of phosgene gas produces a chronic bronchiolo-alveolitis. Physiologically, these animals show increased airway resistance, increased functional residual capacity and uneven distribution of inspired air, all of which are characteristic of emphysema. After several weeks of such exposure, they also show microscopic changes suggestive of emphysema. These experiments support the hypothesis that recurrent bronchiolo-alveolitis is the basic lesion in emphysema. They may also assist the further understanding of this disease by facilitating study of the correlation between changes in structure and in function and by providing a model in which therapy may be evaluated. (Author)

AD-623 970 Fld. 6/5
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX
PARALLELISM BETWEEN LOCALIZATION OF INJECTED PROTEINS AND THEIR SEROLOGICAL CORRESPONDENCE,
by Warren J. Russell, and William G. Glenn. 15 Feb 65, 10p. Rept. no. sam-TR-65-309
Unclassified report

Availability: Published in Comp. Biochem. Physiol. V16 P21-8 1965. Copies to DDC users only.

Descriptors: (*Immunology, Proteins), (*Proteins, Immunology), (*Serodiagnosis, Gamma globulin), In vitro analysis, In vivo analysis, Immune serums, Injection (Medicine), Skin, Humans, Rabbits, Swine

A study was made of the relationship between the taxonomic origin of a foreign protein solution and the ability of rabbits to localize this solution after injection. In vitro serological correspondence analyses showed human gamma-globulin to be more closely related to rabbit gamma-globulin than is pig gamma-globulin. Equal concentrations and amounts of human and pig gamma-globulin were separately injected intradermally into the skin or rabbits. Serum samples were obtained at several time intervals post-injection. The relative amounts of human and pig gamma-globulin present in each sample were determined by quantitative gel diffusion analysis. Pig gamma-globulin was determined to be in lesser concentration in the serum and, combined with previous studies, this finding is presumptive evidence of increased localization of this more distantly related solution. The use of this in vivo approach for comparative serological studies appears to be unique and is based on valid principles of serological correspondence. (Author)

AD-623 981 Fld. 6/5, 7/3, 7/4, 11/9
CFSTI Prices: HC $2.00 MF $0.50
CEDARS-SINAI MEDICAL CENTER LOS ANGELES CALIF POLYMER DIV
HYDROGELS OF POLY (HYDROXYETHYL METHACRYLATE) AND HYDROXYETHYL METHACRYLATE - GLYCEROL MONOMETHACRYLATE COPOLYMERS,
by H. Yasuda, Michael Gochin, and William Stone, Jr. 1965, 29p. Contract Nonr-4800(00) Grant ,NIH-NB-06077
Unclassified report

Descriptors: (*Prosthetics, Polymers), (*Gels, Scientific research), (*Acrylic resins, Gels), (*Membranes, Gels), Membranes, Polymerization, Hydrates, Optical properties, Solvents, Water, Glycols, Ophthalmology, Eye

Hydrophilic three dimensional polymer networks (hydrogels) were prepared from hydroxyethyl methacrylate and copolymer of HEMA and glycerol monomethacrylate. The equilibrium water content of the hydrogels in water was investigated as a function of the initial dilution of the polymerization mixture, the type of solvent, and the hydrophilicity of the polymer. The initial dilution was found to have a decisive effect on the swelling or deswelling of hydrogels after the completion of the gel formation. With relatively less hydrophilic hydrogels, there is a critical initial dilution to produce the gel which does not swell or deswell in water after the gel formation. This 'iso-volumic' initial dilution shifts toward a higher dilution as the hydrophilicity of the hydrogels increases; however, when hydrophilicity of the polymer rises above a certain point, gels always swell in water. Permeability of oxygen through hydrogels was also studied. (Author)

AD-623 982 Fld. 6/5, 11/9
CFSTI Prices: HC $2.00 MF $0.50
CEDARS-SINAI MEDICAL CENTER LOS ANGELES CALIF CORNEA EYE INST
A 15-YEAR STUDY OF THE PLASTIC ARTIFICIAL CORNEA; BASIC PRINCIPLES,
by W. Stone,Jr., H. Yasuda, and M. F. Refojo. 1965, 27p. Contract Nonr-3662(01) Grant, NIH-NB-1027 Proj. NR-105-163
Unclassified report

Descriptors: (*Cornea, Implants), (*Plastics, Cornea), (*Prosthetics, Eye), Plastic surgery, Surgical techniques, Polymers, Acrylic resins, Transplantation, State-of-the art reviews, Pathology, Tolerances (Physiology), Ophthalmology

The paper presents the development of the plastic artificial cornea under the following headings: Significant history in the development of the plastic artificial cornea (three periods): (a) From 1850-1905; (b) From 1905-1949; and (c) From 1949-1964; The need for the plastic artificial cornea; The major problems and their solutions; Eight basic principles for maintenance of the plastic artificial cornea in the eye; Description of two implants designed, in compliance with the eight basic principles, to provide latitude in the care of complications; and The necessity for continued research with controlled and long term studies.

AD-623 983 Fld. 6/5, 7/3, 7/4
CFSTI Prices: HC $1.00 MF $0.50
CEDARS-SINAI MEDICAL CENTER LOS ANGELES CALIF POLYMER DIV
PERMEABILITY OF POLYMER MEMBRANES TO DISSOLVED OXYGEN,
by H. Yasuda, and William Stone,Jr.. 1962, 9p. Contract Nonr-4800 (00) Grant ,NIH NB-06077

Unclassified report

Descriptors: (*Polymers, Membranes), (*Membranes, Permeability), (*Oxygen, Membranes), (*Prosthetics, Polymers), Polarographic analysis, Test methods, Acrylic resins, Siloxanes, Halogenated hydrocarbons, Hydrates, Eye, Gels, Membranes, (Biolology), Ophthalmology

The permeation of dissolved oxygen through membranes is an important phenomenon in many biological systems. The polarographic method of measuring oxygen provides a quick and accurate means of measuring the permeability of oxygen through many membranes, both in the gas phase and as dissolved oxygen. The oxygen permeability can be utilized as a means of estimating changes in the structure of hydrated membranes, especially hydrophilic polymer membranes and hydrated polymer gels.

AD-623 984 Fld. 6/5, 7/3
CFSTI Prices: HC $1.00 MF $0.50
RETINA FOUNDATION BOSTON MASS CORNEAL RESEARCH UNIT
GLYCERYL METHACRYLATE HYDROGELS,
by Miguel F. Refojo. 1965, 18p. Contract Nonr-3662 (01) Grant ,NIH-NB-1027 Proj. NR-105-163

Unclassified report

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Gels, Acrylic resins), (*Acrylic resins, Membranes), (*Prosthetics, Polymers), Hydrates, Water, Equilibrium, Polymerization, Optical properties, Refractive index, Ophthalmology, Eye

Hydrophilic three dimensional polymer networks (hydrogels) were prepared from glyceryl methacrylate (2,3-dihydroxypropyl methacrylate). The solubility of poly (glyceryl methacrylate) in water permits the preparation of transparent hydrogels containing variable amounts of water at the equilibrium stage; this is accomplished by varying the degree of swelling at the time of network formation, and by varying the density of cross-links. The temperature dependence of swelling of the hydrogels in water, and in 0.9% sodium chloride solution, was determined. There exists a linear relationship between the refractive index and the per cent of water in the hydrogel. These hydrogels are potentially useful in ophthalmology. (Author)

AD-624 014 Fld. 6/5, 12/1
CALIFORNIA UNIV LOS ANGELES SPACE BIOLOGY LAB
ANALYSIS OF BRAIN-WAVE GENERATORS AS MULTIPLE STATISTICAL TIME SERIES.
Revised ed.,
by D. O. Walter, and W. R. Adey. 28 Oct 64, 9p. Contract NsG-203-62 ,AF-AFOSR-61-81 AFOSR 65-1586

Unclassified report

Research supported in part by grant PHS-B-1883. Revision of manuscript received 27 Apr 64.

Availability: Published in IEEE Transactions on Biomedical Engineering VBME-12 N1 P8-13 Jan 1965. Copies to DDC users only.

Descriptors: (*Electroencephalography, Statistical analysis), (*Statistical analysis, Electroencephalography), Series; Waveform generators

An illustrative example of the spectral analysis of simultaneously recorded electroencephalograms (EEG's) is presented. The first topic is that of auto-spectral analysis, which is very similar to frequency analysis; then cross-spectral analysis is used to show that the major relationship among three of the traces analyzed is a linear one, while a fourth trace is nonlinearly activated. Two hypothesis suggested by this analysis are tested by methods of multivariate spectral analysis, a recently developed extension of the cross-spectral method. Another extension, generator analysis, whose theory has not previously appeared, is presented both theoretically and in application to the same example. It incidentally provides a graphic summary of the multivariate relations among all the traces; but, more significantly, represents a substantial step toward the goal of identifying and localizing the actual biophysical generators which produces the observed electroencephalograms. (Author)

AD-624 042 Fld. 6/5
CFSTI Prices: HC $2.00 MF $0.50
DUKE UNIV DURHAM N C DEPT OF ANATOMY
HISTOLOGIC STUDY OF THE EFFECTS OF PROFOUND HYPOTHERMIA ON SPINAL CORD OF THE DOG.
Interim rept. Jun 63-Sep 64,
by Charlene M. Nelson, Talmage L. Peele, Maurice A. Lesage, and Will C. Sealy. Aug 65, 38p. Contract AF33(637)-9629 Proj. AF-8237 Task 823703
AAL TR-64-35

Unclassified report

Descriptors: (*Spinal cord, Histology), (*Blood circulation, Surgical techniques), (*Surgical techniques, Hypothermia), (*Hypothermia, Spinal cord), Lungs, Heart, Surgery, Blood vessels, Obstruction (Physiology), Nerve cells, Central nervous system, Histological techniques, Pathology, Tables

A study was made of the microscopic effects of profound hypothermia on spinal cord of the dog. Samples of cervical, thoracic, lumbar and sacral cord levels of three normal and eight experimental dogs were examined. In the experimental sections the axons and myelin were apparently unaltered, and the number of anterior horn cells was within normal limits. Changes in the experimental sections included the appearance of slight to moderate chromatolysis, hyperchromic, pyknotic neurons, and most commonly, gliosis, which was more evident in the lumbar and sacral cord levels. The findings of the present study were in agreement with the results other authors have reported in studies on ischemia by vascular occlusion. Although the alterations found in the spinal cords of the experimental dogs were not extensive, it is believed that these animals had been subjected to a condition of mild ischemia. (Author)

AD-624 103 Fld. 6/5
CFSTI Prices: HC $2.00 MF $0.50
INSTITUT NATIONAL DE LA SANTE ET DE LA RECHERCHE MEDICALE MARSEILLE (FRANCE) UNITE DE RECHERCHES NEUROBIOLOGIQUES
THE VISUALLY EVOKED POTENTIALS RECORDED TRANSCRANIALLY IN NORMAL MAN.
Final rept.,
by Henri J. P. Gastaut. 31 Oct 64, 35p. Contract AF-EOAR-15-64 AFOSR 65-1686

Unclassified report

Descriptors: (*Electroencephalography, Vision), (*Visual perception, Electroencephalography), B ionics, Voltage, Recording systems, Digital computers, Motor reactions, Adaptation (Physiology), France

A study was made of the relationships between the E.E.G. and the behaviour or sensory-motor functions of normal man. An evaluation was made of the utility of the Phasotron. An investigation was made of the different aspects of the visually-evoked potentials recorded transcranially in healthy and diseased man.

AD-624 105 Fld. 6/5, 6/16
TEXAS UNIV GALVESTON CELL BIOLOGY UNIT
TRICARBOXYLIC ACID CYCLE IN WOUND HEALING BY GRANULATION,
by Wiktor W. Nowinski, Truman G. Blocker,Jr., and Tatsuya Ohkubo. 13 Apr 65, 5p. Contract Nonr-1598 (05)

Unclassified report

Availability: Published in Proceedings of the Society for Experimental Biology and Medicine V119 P1011-4 1965. Copies to DDC users only.

Descriptors: (*Wounds + injuries, Healing), (*Healing, Metabolism), Enzymes, Tissues (Biology), Granules, Oxygen consumption, Glucose, Lactic acid, Connective tissue, Histology, Surgery

The existence of all the enzymes of Tricarboxylic Acid Cycle in granulation tissue was demonstrated by the increase in oxygen consumption in the presence of appropriate intermediates. No effect was observed with added glucose and values for aerobic and anaerobic lactic acid production by 10-day-old granulation tissue were identical. These results suggest the absence of Pasteur effect at this stage of wound healing. (Author)

AD-624 106 Fld. 6/5, 6/3
LOBUND LAB UNIV OF NOTRE DAME IND
IRON AND COPPER UTILIZATION IN RABBITS AS AFFECTED BY DIET AND GERMFREE STATUS,
by B. S. Reddy, J. R. Pleasants, D. R. Zimmermanand , and B. S. Wostmann. 19 Mar 65, 8p. Contract Nonr-1623 (13) ,Grant PHS-HD-00855

Unclassified report

Availability: Published in Journal of Nutrition V87 N2 P189-96 Oct 65. Copies to DDC users only.

Descriptors: (*Nutrition, Germ-free animals), (*Germfree animals, Nutrition), Iron, Copper, Hemoglobin, Hematocrit, Blood chemistry, Diet, Anemias, Liver, Spleen, Kidneys, Rabbits

Germfree rabbits maintained with steam-sterilized diets containing moderate amounts of iron and copper from natural ingredients but relatively high amounts of these minerals as supplemental salts, showed low hemoglobin, hematocrit and plasma iron levels, and high plasma total iron-binding capacity (TIBC) values. Plasma copper values were normal. Either conventionalization of these germfree rabbits or transfer to a steam-sterilized diet which contained more iron from natural ingredients (soybean meal) but less total amount of this mineral alleviated all symptoms of iron deficiency anemia within 4 weeks. The effect of feeding this last diet to germfree and conventional rabbits from weaning was then investigated. After the diet had been fed for 8 weeks, plasma copper, iron, TIBC, and percentage saturation of iron-binding protein levels were similar in germfree and conventional rabbits. Hemoglobin and hematocrit values were slightly lower but within normal range in

germfree rabbits. The iron content of liver, spleen and kidney was lower in germfree rabbits than in conventional rabbits. There was no difference between the copper content in these organs. It is concluded that germfree rabbits utilized iron more efficiently from a natural source than from the usual mineral supplement. (Author)

AD-623 760 See Fld. 6/13

AD-623 786 See Fld. 6/20

AD-623 967 See Fld. 5/9

AD-624 008 See Fld. 6/16

AD-624 010 See Fld. 6/16

AD-624 011 See Fld. 5/10

AD-624 037 See Fld. 6/13

6/6. ENVIRONMENTAL BIOLOGY

AD-623 962 Fld. 6/6, 1/3
PACAF EPIDEMIOLOGICAL LAB SAN FRANCISCO CALIF 96274 EPIDEMIOLOGICAL FLIGHT (5TH)
AN EXAMINATION OF UNITED STATES AIR FORCE AERIAL SPRAY OPERATIONS.
Technical rept.,
by Frank. H. Dowell. 1965, 10p. Rept. no. tr-3-65

Unclassified report

Availability: Published in Mosquito News V25 N2 P209-16 Jun 1965.

Descriptors: (*Insect control, Air force operations), (*Sprays, Insecticides), (*Insecticides, Airborne), Epidemiology, Culcidae, Effectiveness, Aircraft, Aircraft equipment, Particle size

A unified concept of aerial spraying has been developed based on existing Air Force doctrine. The main elements of this concept are centralization, mobility, flexibility, and integral technical monitoring. The selection of aircraft types, design of equipment and development of techniques have been in accordance with these principles. In practice, this allows the United States Air Force to bring a tailored aerial spray force to bear anywhere for any purpose within 7-10 days. This appears to have been a successful application of the known, tested, principles of air power and military management to what is, for the military, an esoteric field. (Author)

6/8. FOOD

AD-623 712 Fld. 6/8
CFSTI Prices: HC $3.00 MF $0.75
TRONCHEMICS RESEARCH INC SOUTH HACKENSACK N J
METHOD FOR CONTROLLING FRAGMENTATION OF DRIED FOOD DURING COMPRESSION.
Final technical rept. for Dec 64,
by Norman H. Ishler. Aug 65, 100p. Contract DA-19-129-AMC-2 (X) Proj. DA-7X84-06-031 USA NLABS FD-13

Unclassified report

Descriptors: (*Dehydrated foods, Compressive properties), Preparation, Processing, Freeze drying, Particle size, Control, Sprays, Water, Glycols, Alcohols, Glycerols, Propenes, Storage, Stability, Military rations, Measurement, Tests

Methods have been developed whereby a broad range of dehydrated foods can be compressed at 1000 p.s.i. into dense, cohesive bars which rehydrate readily with little fragmentation to original characteristics. Examination included 15 food types. Measurement of fragmentation is described. Storage stability is reported. A progress flow chart is included. (Author)

6/11. LIFE SUPPORT

AD-623 966 Fld. 6/11, 13/2, 20/12
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX CHEMICAL SUPPORT SECTION
MULTI-STAGE CRYOGENIC TRAPPING SYSTEM,
by James P. Conkle, James W. Registerand , and Gordon L. Worth. 1965, 6p. SAM TR-65-303

Unclassified report

Availability: Published in Aerospace Medicine V36 N9 P869-74 Sep 1965. Copies to DDC users only.

Descriptors: (*Air pollution, Collecting methods), (*Cryogenics, Decontamination), (*Closed ecological systems, Air pollution), Contamination, Portable, Instrumentation, Nitrogen, Cylindrical bodies, Liquefied gases, Separation, Design

A portable, easily operated, multi-stage cryogenic trapping system contained in a box 86 x 66 x 61 centimeters was developed. Liquid nitrogen, gaseous nitrogen, ice, dry ice and 110 volt 60 cycle power required for operation of the system are available to most military installations. Ice formation in the -78C trapping cylinder entrance tube and liquid oxygen formation in the -175C trapping cylinder were eliminated in the design of the system. Catalytic conversion of trapped materials was minimized by use of stainless steel and Teflon. Operation of the system was simplified by inclusion of a liquid nitrogen level-controller. Partial separation of compounds was accomplished by operating the trapping cylinders of the system at three different temperatures. Several compounds are listed according to the temperature at which they are expected to be concentrated in significant quantities. The system is efficient for concentration of micro and macro contaminants in an atmosphere. The concentration of a contaminant in a sample area may be estimated from the total trapping time, the flow through the system during trapping and the concentration of the contaminant in the trapping cylinders. (Author)

AD-624 121 See Fld. 5/1

6/13. MICROBIOLOGY

AD-623 760 Fld. 6/13, 6/5
NAVAL MEDICAL RESEARCH UNIT NO 4 GREAT LAKES ILL
MYCOPLASMA PNEUMONIAE IN PRIMARY ATYPICAL PNEUMONIA,
by John P. Griffin, and York E. Crawford. 1965, 6p. Proj. MR005.09-1305.3 NAVMED MR005.09-1305.3

Unclassified report

Availability: Published in Journal of the American Medical Association V193 N12 P1011-6 Sep 20 1965. Copies to DDC users only.

Descriptors: (*Mycoplasma, Respiratory diseases), (*Serodiagnosis, Pleuropneumonia-like organisms), (*Pleuropneumonia-like organisms, Respiratory diseases), Medical examination, Diagnosis, Culture media

A cultural and serologic study of primary atypical pneumonia (PAP) was done prospectively in 239 randomly chosen recruit admissions to the US Naval Hospital, Great Lakes, Ill. Cold-agglutining reactive sera were found in 172 patients, while evidence of Mycoplasma pneumoniae (Eaton agent) infection was detected in 41. M pneumoniae-associated PAP was consistently found among cold-agglutinin-positive patients. However, the number of cold-agglutinin reactors greatly exceeded that of recognizable M pneumoniae infections in this series. The isolation of wild strains of M pneumoniae from 25 patients on artificial agar medium was statistically related to the presence of complement-fixing antibodies to the FH strain (American Type Culture Collection, Mycoplasma pneumoniae No. 15531) of this microorganism. (Author)

AD-624 037 Fld. 6/13, 6/5
WASHINGTON UNIV SEATTLE
THE NON-BACTERIAL ETIOLOGY OF ACUTE LOWER RESPIRATORY TRACT DISEASE IN CHILDREN, A REVIEW,
by E. Russell Alexander. 1965, 11p. Contract DA-49-193-MD-2294 NAMRU-2 Lecture Review Ser-65-1

Unclassified report

Presented as a special lecture at the Annual Meeting of the Pediatric Association of the Republic of China (6th), Taipei, Taiwan, 4 Apr 65.

Availability: Published in Acta Paediatrica Sinica V6 N3 P181-9 Jul-Sep 1965. Copies to DDC users only.

Descriptors: (*Respiratory diseases, Etiology), (*Children, Respiratory diseases), Pleuropneumonia-like organisms, Influenza virus, Parainfluenza virus, Adenoviruses, Mycoplasma, Vaccines, State-of-the-art reviews, Epidemiology

The non-bacterial causes of lower respiratory tract disease in children have been reviewed. If all the latest techniques were available in one laboratory, about two thirds of lower respiratory tract infections in children could be identified. The most important single agent is respiratory syncytial virus. Adenoviruses, influenza and parainfluenza together cause about the same number of illnesses as respiratory syncytial virus, but the illnesses are generally milder. Mycoplasma pneumoniae accounts for a significant proportion of disease in children over five years of age. Only for influenza is a vaccine available and this is limited by short duration of protection and moderately severe side reactions, although oil adjuvant influenza vaccine is more promising. For the rest, vaccines or antiviral agents would be welcome, and it is most needed for respiratory syncytial virus. (Author)

AD-624 069 Fld. 6/13, 6/1
SINAI HOSPITAL OF BALTIMORE MD BIOCHEMISTRY RESEARCH DIV
THE CLEAVAGE OF BILE ACID CONJUGATES BY CELL-FREE EXTRACTS FROM CLOSTRIDIUM PERFRINGENS,
by P. P. Nair, M. Gordon, S. Gordon, J. Reback, and A. I. Mendeloff. 26 Jul 65, 7p. Contract Nonr-2424 (01) Grant ,PHS-AM-01417

Unclassified report

Availability: Published in Life Sciences V4 P1887-92 1965. Copies to DDC users only.

Descriptors: (*Bile, Clostridium perfringens), (*Clostridium perfringens, Bile), Culture media, Aerobacter aerogenes, Enterobacteriaceae, Peptides, Enzymes, Hydrolysis, Amino acids, Gas chromatography

Glycocholic and taurocholic acids are cleaved by Clostridia (types A-E) when grown in a medium containing these conjugated bile acids. Similarly, Aerobacter aerogenes and several species of Enterococci cleave the peptide bond of conjugated bile acids presumably by the mediation of extracellular enzymes. In the course of recent studies it was found that cell-free extracts from harvested cells of certain strains of Clostridium perfringens actively hydrolyzed the conjugates of the natural bile acids. The fact that not all strains of C. perfringens yielded the enzyme as would be expected, and that the optimum conditions for activity were different from those reported led the researchers to assume the presence of a distinctly different enzyme in the preparations. The specific hydrolysis

of the naturally occurring bile acid conjugates by cell-free extracts from Clostridium perfringens is demonstrated. (Author)

AD-624 104 Fld. 6/13, 6/1
CALIFORNIA UNIV LOS ANGELES DEPT OF ZOOLOGY
SUCCINATE TRANSPORT IN EUGLENA.
Revised ed.,
by B. H. Levedahl. 23 Mar 65, 9p. Contract Nonr-233 (95) Proj. NR-108-673
Unclassified report

Revision of manuscript submitted 15 Dec 64.

Availability: Published in Experimental Cell Research V39 P233-41 1965. Copies to DDC users only.

Descriptors: (*Microorganisms, Metabolism), (*Succinates, Microorganism), Algae, Ingestion (Physiology), Antimetabolites, Transport properties, Growth, Respiration, Oxidoreductases, Protozoa

The mechanism of uptake of succinate by Euglena gracilis var bacillaris (streptomycin bleached) was investigated with the aid of metabolic inhibitors and structural analogs of succinate. The data obtained can best be explained if one assumes a transport system for succinate. This transport system appears to have a specificity different from the succinoxidase system of mitochondria and is specific for succinate. It appears to be a three point attachment site which requires two carboxyl groups in a cis configuration separated by no more than 3 carbon atoms and two intact hydrogens at the C-2 position. This transport system is not related to that proposed for the active uptake of acetate nor is it the same as the system proposed for succinate uptake in Tetrahymena. (Author)

AD-624 242 See Fld. 15/2

6/14. PERSONNEL SELECTION AND MAINTENANCE (MEDICAL)

AD-623 808 Fld. 6/14, 5/9
CFSTI Prices: HC $3.00 MF $0.50
SOUTHERN ILLINOIS UNIV CARBONDALE LAB OF APPLIED PHYSIOLOGY
A PROGRAM OF PHYSICAL DEVELOPMENT FOR ARMY RECRUITS TO CONSERVE MANPOWER BY SELECTION AND SPECIAL TRAINING FOR SPECIFIC MILITARY ASSIGNMENTS. PILOT STUDY I: ESTABLISHMENT OF THE VALIDITY OF SELECTED DIAGNOSTIC TESTS OF PHYSICAL ABILITY OF ARMY RECRUITS.
Technical rept.,
by Jay A. Bender, Frank J. Kobes, Harold M. Kaplan, Gene Salmon, and Joe K. Pierson. Oct 65, 55p. Rept. no. tr-1
Contract DA-ARO-49-092-64-G28
Unclassified report

Descriptors: (*Physical fitness, Army personnel), (*Army personnel, Selection), Army training, Manpower studies, Medical examination, Tests, Reliability, Cardiovascular system, Strength, Rehabilitation, Performance (Human), Motivation, Correlation techniques, Tables

The purpose of this study was to determine whether a technique could be developed which would separate those who would be successful in a given physical task or tasks from those who would not be successful. If this could be achieved, it would provide a useful, objective method for physical classification of military personnel. Better use might then be made of the manpower available for military service. (Author)

6/15. PHARMACOLOGY

AD-624 007 Fld. 6/15, 6/16
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHYSIOLOGY
EFFECT OF DRUGS ON THE STORAGE GRANULES OF ADRENERGIC NERVES,
by U. S. von Euler, and F. Lishajko. 1965, 18p. Contract AF-EOAR-62-14 Proj. AF-9777 Task 977701
AFOSR 65-1541
Unclassified report

Availability: Published in Pharmacology of Cholinergic and Adrenergic Transmission. Proceedings of the International Pharmacological meeting (2nd), Prague Aug 20-23 1963. Copies to DDC users only.

Descriptors: (*Autonomic nervous system, Amines), (*Amines, Autonomic nervous system), (*Drugs, Autonomic nervous system), Nerve cells, Granules, Levarterenol, Adenosine phosphates, Nerve fibers, Phenols, Sympathomimetic agents, Sympatholytic agents, Local anesthetics, Enzyme inhibitors

A number of drugs have been tested on the spontaneous NA-release rate in isolated adrenergic nerve granules and on the ATP-dependent uptake of NA. The spontaneous loss of NA from granules is prevented or inhibited by NA (0.050.1 mm) and by ATP (1-5 mm) owing to NA-uptake balancing the release. ATP also has a marked protective effect. The L-isomer of NA is more active than the D-isomer in this respect, suggesting a preferential storage of the L-isomer. (Author)

AD-624 013 Fld. 6/15, 6/16
OXFORD UNIV (ENGLAND) DEPT OF HUMAN ANATOMY
INHIBITION OF OVULATION IN THE GONADOTROPHIN-TREATED IMMATURE RAT BY CHLORPROMAZINE,
by M. X. Zarrow, and K. Brown-Grant. 3 Feb 64, 9p. Contract AF-EOAR-62-111 AFOSR 65-1546
Unclassified report

Availability: Published in J. Endocrin V30 P87-95 1964. Copies to DDC users only.

Descriptors: (*Ovaries, Chlorpromazine), (*Chlorpormazine, Ovaries), Reproductive system, Inhibition, Pituitary harmones, Dosage, Injection (Medicine), Pregnancy, Rats, Humans, Great Britain

The effect of age and dose of a single injection of pregnant mare serum gonadotrophin (PMS) on spontaneous ovulation in immature Wistar rats is described. Ovulation could be induced by human chorionic gonadotrophin (HCG) at least 6 days before it occurred when pregnant mare serum gonadotrophin alone was given. Chlorpromazine was shown to block pregnant mare serum gonadotrophin-induced ovulation at a dose level (0.25 mg. in a 60 g. rat) which has no effect on the ovulatory response to human chorionic gonadotrophin. Higher doses interfered with the action of injected human chorionic gonadotrophin. Ovulation could be induced in the chlorpromazine-blocked animals by the systemic injection of an extract of bovine median eminence, but the sensitivity was too low to use this response for an assay method. (Author)

AD-624 064 Fld. 6/15, 12/1
HARVARD UNIV CAMBRIDGE MASS
THE ROBBINS-MONRO METHOD FOR ESTIMATING THE MEDIAN LETHAL DOSE.
Revised ed.,
by W. G. Cochran, and M. Davis. Oct 64, 20p. Contract Nonr-1866 (37) Grant ,NSF-GP-683 Proj. NR-042-097
Unclassified report

Revision of manuscript submitted Sep 64.

Availability: Published in the Journal of the Royal Statistical Society V27 N1 (Serb Methodological) P28-44 1965. Copies to DDC users only.

Descriptors: (*Dosage, Approximation (Mathematics)), (*Approximation (Mathematics), Stochastic processes), Biological assay, Errors, Statistical analysis, Sequential analysis, Survival

The Robbins-Monro method provides a sequential plan that gives an attractively simple estimate of the LD50 in bioassay and is practicable for agents in which the response (death or survival) is known within an hour. By machine computations, its performance is examined for experiments using 50 or less animals. If the experiment's initial guess at the LD50 is within twice the standard deviation of the true LD50, a slight variant of the plan (the delayed version) can be recommended. For new agents in which the experimenter's initial knowledge of the LD50 and of standard deviation may be poor, a two-stage plan is recommended, the first stage using single animals at equally spaced doses, the second stage being an ordinary Robbins-Monro plan. In a preliminary comparison with a standard 4-level nonsequential experiment, the sequential plan gave mean-square errors about 20 per cent lower if standard deviation and the LD50 are guessed accurately, and much larger gains in accuracy if the LD50 is guessed poorly. The problem of attaching a standard error to the Robbins-Monro estimate of the LD50 is discussed. (Author)

AD-623 786 See Fld. 6/20

AD-623 792 See Fld. 6/16

AD-623 800 See Fld. 6/16

AD-623 894 See Fld. 6/5

AD-624 010 See Fld. 6/16

AD-624 117 See Fld. 8/1

6/16. PHYSIOLOGY

AD-623 792 Fld. 6/16, 6/15
CFSTI Prices: HC $1.00 MF $0.50
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHARMACOLOGY
SYMPATHETIC VASODILATOR OUTFLOW.
Final technical rept.,
by Borje Uvnas. 13 Nov 63, 9p. Contract AF-EOAR-27-64 AFOSR 65-1529
Unclassified report

Descriptors: (*Autonomic nervous system, Cardiovascular system), (*Cardiovascular system, Autonomic nervous system), (*Vasoactive agents, Cardiovascular system), Neuromuscular transmission, Musculoskeletal system, Thalamus, Stimulation, Auditory signals, Fear, Behavior, Animals, Nerve fibers, Blood circulation, Blood pressure, Pulse rate, Reflexes, Sweden

Sympathetic vasodilator nerves to the skeletal muscles in dogs were activated by: (1) Electrical hypothalamic stimulation in anaesthetized dogs; (2) electrical hypothalamus stimulation in unanaesthetized dogs by chronically implanted electrodes; and (3) external stimuli (firing shot) to unanesthetized dogs. Activation of sympathetic vasodilator nerves seems to be associated with a behavior reaction pattern that could be interpreted as due to fear. The occurrence of sympathetic vasodilator fibers to the skeletal muscles of various species was investigated. Vasodilator fibers were found in the five different species of beasts studied, but not in 7 species of apes and lemurs investigated. The observation has a bearing on the undissolved question concerning the existence of sympathetic vasodilator fibers to the skeletal muscles in man. (Author)

AD-623 799 Fld. 6/16
CFSTI Prices: HC $2.00 MF $0.50
NAPLES UNIV (ITALY) ISTITUTO DE FISICA TEORICA
OBSERVATIONS ON SPIKE SEQUENCES FROM SPONTANEOUSLY ACTIVE PURKINJE CELLS IN THE FROG.
Final scientific rept.,
by V. Braitenberg, G. Gambardella, G. Ghigo, and U. Vota. 20 Nov 64, 36p. Contract AF-EOAR-89-63 ,NIH-NB-03922-02 AFOSR 65-1488
Unclassified report

Descriptors: (*Nerve cells, Cerebellum), (*Nerve impulses, Mathematical models), Nervous system, Physiology, Stimulation, Nerve fibers, Statistical processes, Correlation techniques, Amphibians, Italy

AD-623 800 Fld. 6/16, 6/15
CFSTI Prices: HC $2.00 MF $0.50
PARMA UNIV (ITALY) INST OF HUMAN PHYSIOLOGY
ISOLATE UNIT ACTIVITY IN CENTRAL VISUAL PATHWAYS.
Scientific rept. no. 1, 1 Jan-31 Aug 65,
by A. Arduini. 31 Aug 65, 30p. Rept. no. IHP-65-1
Contract AF-EOAR-8-65 Proj. AF-9777 Task 9777-01
AFOSR 65-2216
Unclassified report

Descriptors: (*Vision, Nervous system), (*Cerebral cortex, Vision), Nerve cells, Brain, Adaption (Physiology), Barbiturates, Curare alkaloids, Nerve impulses, Retina, Nerve fibers, Physiology, Cats, Italy

Isolated neuronal discharges were led through microelectrodes from the fibers of the geniculo-cortical and cortico-thalamic tracts of the cat's visual system. A comparison was made of the interval histograms of the neuronal activity during dark adaptation in three different preparations: (1) intact brain anesthetized (Nembutal); (2) intact brain curarized; (3) midpontine, pre-trigeminally transected. In the anesthetized preparation interval histograms of the neuronal discharges in dark adaptation were also compared in the presence and in the absence of synchronized retinal activity. (Author)

AD-624 005 Fld. 6/16
PENNSYLVANIA UNIV PHILADELPHIA DEPT OF PHYSIOLOGY
HYPOTHALAMIC FSH AND LH-RELEASING FACTORS,
by S. M. McCann, V. D. Ramirez, and M. Igarashi. 1963, 15p. Contract AF-AFOSR-62-133, NIH-AM-1236-07 Proj. AF-9777 Task 977701
AFOSR 65-1508
Unclassified report

Availability: Published in Metabolism V13 N10 PT2 P1177-89 Oct 64. Copies to DDC users only.

Descriptors: (*Thalamus, Hormones), (*Hormones, Secretion), Peptides, Adrenocorticotropic hormone, Pituitary hormones, Tissue extracts, Ovaries, Ascorbic acid, Estrogens, Progesterone, Steroids, Rats

The stalk-median eminence of the hypothalamus appears to contain a luteinizing hormone-releasing factor, LH-RF, which is a small, active polypeptide with mol wt less than 3500, and is dissimilar from known neurohypophysial hormones and corticotrophin-releasing factors. Hypothalamic control over LH secretion also appears to be mediated by means of secretion of LH-RF into hypophysial portal vessels. It remains to be determined if the LH-RF and follicle stimulating hormonereleasing factor are distinct entities or part of a Gonadotrophin-releasing complex. (Author)

AD-624 008 Fld. 6/16, 6/5
FREE UNIV BERLIN (GERMANY)
DIURESIS INDUCED BY WATER INFUSION INTO THE CAROTID LOOP AND ITS INHIBITION BY SMALL HEMORRHAGE. THE COMPETITION OF VOLUMEAND OSMOCONTROL,
by Joachim O. Arndt. 8 Aug 64, 10p. Contract AF-EOAR-62-75 AFOSR 65-1543
Unclassified report

Availability: Published in Pflugers Archiv V282 P131-22 1965. Copies to DDC users only.

Descriptors: (*Osmosis, Blood volume), (*Blood volume, Osmosis), Urine, Water, Excretion, Hemorrhage, Blood pressure, Blood transfusions, Parenteral infusions, Pulse rate, Electrolytes (Physiology), West Germany

In five unanesthetized trained dogs the effect on urine flow of the osmotic stimulus of a slow intracarotid water infusion alone and combined with a mild hemorrhage of 8% of the estimated blood volume was investigated. The blood loss was too small to cause any change in blood pressure or heart rate. In contrast to the effect of intracarotid infusion of 3 ml water/min over a 30 min period no diuresis occurred when this infusion was combined with a slow hemorrhage of 150 ml applied during the first 10 min of the infusion period. In the majority of cases restoration of blood volume by retransfusion of the hemorrhaged blood was promptly followed by water diuresis. In all maneuvers the diuresis was entirely due to a change in free water clearance. The excretion of osmotically active material was unchanged. It is concluded that during a competition of the control systems of osmotic pressure and fluid volume the former is acutely overruled if the homeostasis of fluid volume is jeopardized. (Author)

AD-624 009 Fld. 6/16
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHYSIOLOGY
THE DISTRIBUTION OF NORADRENALINE AND ADRENALINE IN THE FALLOPIAN TUBE OF THE RABBIT,
by Jan Brundin. 26 Feb 64, 7p. Contract AF-EOAR-62-14 Proj. AF-9777 Task 9777-01
AFOSR 65-1542
Unclassified report

Availability: Published in Acta Physiol. Scand. V62 P156-9 1964. Copies to DDC users only.

Descriptors: (*Reproductive system, Autonomic nervous system), (*Autonomic nervous system, Reproductive system), Epinephrine, Levarterenol, Histological techniques, Rabbits, Sweden

The study was undertaken in an attempt to explain the functional difference between the isthmic and ampullary regions of the oviduct in the rabbit by a difference in the distribution of their adrenergic nerve supply. The isthmus contains considerable amounts of noradrenaline (NA), while the NA contents of the ampulla and uterus are low. Adrenaline (A) was found in low concentrations in all of the preparations studied. Some implications of the distribution of NA in the different regions are discussed. (Author)

AD-624 010 Fld. 6/16, 6/5, 6/15
LUND UNIV (SWEDEN) DEPT OF PHARMACOLOGY
NEUROMUSCULAR TRANSMISSION WITH SPECIAL REFERENCE TO MYASTHENIA GRAVIS,
by Dan Elmqvist. 1965, 35p. Contract AF-EOAR-63-12 ,PHS-B-2646 AFOSR 65-1547
Unclassified report

Availability: Published in Acta Physiologica Scandinavica V64 Suppl. 249 P1-34 1965. Copies to DDC users only.

Descriptors: (*Neuromuscular transmission, Acetylcholine), (*Acetylcholine, Neuromuscular transmission), Electrophysiology, Diseases, Nerves, Muscules, Nerve impulses, Ions, Inhibition, In vitro analysis, Biopsy, Pathology, State-of-the art reviews, Skeletal muscle relaxants

Investigations with repetitive stimulation of the normal neuromuscular junction have shown several weak links in the chain of events leading to the release of acetylcholine quanta: (1) The pool from which acetylcholine quanta is directly released is only sufficient for a few impulses. (2) The fraction of this pool which is released by a nerve impulse is influenced by the ionic environment and by previous activity. (3) The rate at which transmitter release can continue with reptitive stimulation is governed by the mobilization of acetylcholine quanta into this pool. (4) The store of transmitter from which acetylcholine quanta are mobilized to become available for release has a limited size and is only slowly replenished, probably by the formation of new quantal units. Mobilization can therefore only keep up with intense release for a short period of continuous rapid stimulation. (5) The synthesis of acetylcholine in the nerve terminal can be insufficient due to the lack of substrate or due to the presence of inhibiting drugs such as hemicholinium, and acetycholine content of the quantal packets may be reduced. (Author)

AD-624 039 Fld. 6/16
CFSTI Prices: HC $2.00 MF $0.50
CEDARS-SINAI MEDICAL CENTER LOS ANGELES CALIF POLYMER DIV
THEORETICAL STUDY OF THE FLUID TRANSPORT AND THE HYDRATION OF THE CORNEA,
by H. Yasuda. 1965, 43p. Contract Nonr-3662 (01) Grant ,NIH-NB-4281 Proj. NR-105-163
Unclassified report

Descriptors: (*Cornea, Transport properties), Absorption, Thickness, Permeability, Water, Thermodynamics, Theory

An attempt is made to analyze available data in the transport, the swelling and the imbibition property of the corneal stroma from the basis of the barrier properties of a substance and of thermodynamics of the processes.

AD-623 724 **See Fld. 6/19**

AD-623 798 **See Fld. 6/5**

AD-624 007 **See Fld. 6/15**

AD-624 013 **See Fld. 6/15**

AD-624 105 **See Fld. 6/5**

6/18. RADIOBIOLOGY

AD-623 968 Fld. 6/18
TEXAS UNIV AUSTIN
LEUKEMIA IN THE RHESUS MONKEY (MACACA MULATTA) EXPOSED TO WHOLE-BODY NEUTRON IRRADIATION,
by R. Zalusky, J. J. Ghidoni, J. McKinley, T. P. Leffingwell, and G. S. Melville. 12 Nov 64, 10p. Contract AF41 (609)-2005 SAM TR-65-313
Unclassified report

Availability: Published in Radiation Research V25 N2 P410-6 Jun 1965. Copies to DDC users only.

Descriptors: (*Radiation effects, Leukemia), (*Leukemia, Radiation effects), Whole body irradiation, Pathology, Hematology, Bone marrow, Spleen, Lymphatic system, Blood vessels, Heart, Kidneys, Liver, Bronchi, Monkeys

Although leukemia can be regularly induced in the mouse and rat by whole-body exposure to ionizing radiation, both spontaneous and radiation-induced leukemias are rare in the rhesus (Macaca mulatta) monkey. This report concerns a single instance of leukemia occurring in an animal exposed to frac-

tionated low doses of whole-body neutron irradiation. Major autopsy findings were a yellow, thickened right atrium and a spleen three times normal size. Bone marrow showed complete replacement of normal marrow constituents. Splenic cords of the red pulp were extensively infiltrated, and the sinusoids were filled with masses of leukemic cells. Lymph node sections showed almost total replacement of the normal architecture by sheets of neoplastic cells. The thickened yellow right atrial wall was massively replaced by leukemic cells. The kidneys contained a diffuse interstitial infiltrate of leukemic cells, with occasional accumulations. The liver showed portal and sinusoidal accumulations of leukemic cells. A small 5-mm bronchial adenoma was found microscopically. Certain features of the leukemia in this monkey are noteworthy when comparison is made to currently available information on the disease in human beings exposed to ionizing radiation in Hiroshima and Nagasaki. (Author)

AD-624 036 Fld. 6/18
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
MICROWAVE HEATING: A STUDY OF THE CRITICAL EXPOSURE VARIABLES FOR MAN AND EXPERIMENTAL ANIMALS,
by Lothar O. Hoeft. Jul 65, 5p. Rept. no. amrl-TR-64-127
Proj. AF-7232 Task 723204
Unclassified report

Availability: Published in Aerospace Medicine V36 N7 P621-2 Jul 1965. Copies to DDC users only.

Descriptors: (*Radiobiology, Microwaves), (*Microwaves, Heat tolerance), Exposure, Body temperature, Heat transfer coefficients, Mathematical models, Mathematical prediction, Tolerances (Physiology), Humans, Animals

Extrapolating the results of microwave heating experiments from various species of animals to man has been done frequently without accounting for interspecies differences in mass and size. The objective of this study was to derive a theoretical basis for extrapolation and to suggest ways to improve experiments designed to investigate nonthermal effects of microwaves. The exposure times required to produce a 5C temperature rise in man and experimental animals were calculated as a function of the microwave intensity using a simplified model. These calculations show that, while the intensity for which infinitely long exposures are permitted is approximately the same for all species, higher intensities will elevate temperatures quicker in small animals than in larger ones. This difference in heating rates should be taken into account in experiments designed to investigate the nonthermal effects of microwaves. (Author)

AD-624 151 Fld. 6/18, 5/10
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
THE HUMORAL FACTOR IN RADIATION-INDUCED MOTIVATION,
by Edward L. Hunt, and Donald J. Kimeldorf. 15 Oct 65, 39p. Rept. no. usnrdl-TR-925
Unclassified report

Descriptors: (*Radiation-effects, Motivation), (*Conditioned reflex, Radiation effects), Learning, Behavior, X rays, Radiological dosage, Anesthesia, Central nervous system, Rats

According to the evidence now available, the motivational effect of irradiation, exhibited in various conditioned avoidance responses, has general characteristics whereby it can be differentiated from the prompt stimulatory effects of irradiation. However, prompt stimulatory effects resulting from 'high' rates of exposure (circa 3 R/min, and more) might contribute to non-neurogenic (humoral) motivational effects. Nevertheless, the motivational effect can be produced independently of neurogenic contributions. In one experiment, it was found that in rats temporarily deeply anesthetized during X-irradiation with 90 R (60 R/min), a conditioned aversion to saccharin-flavored fluid could be produced by providing a taste experience with saccharin in the postanesthesia-postexposure period. The preliminary findings in another study, still in progress, indicate that in rat pairs joined by a vascular, non-neural anastomosis, a saccharin aversion can be conditioned in the shamirradiated member following exposure of its partner to 360 R of X-rays (24 R/min). This constitutes positive evidence for a systemic humoral factor which can mediate radiation-induced motivation. (Author)

AD-624 221 Fld. 6/18
CFSTI Prices: HC $1.00 MF $0.50
NEW YORK UNIV N Y SCHOOL OF ENGINEERING AND SCIENCE
HAZARDS OF MICROWAVE ELECTROMAGNETIC RADIATION.
24 Jan 58, 9p. Rept. no. sete-210/14
Proj. SETE
Unclassified report

Descriptors: (*Radiobiology, Microwaves), (*Microwaves, Radiobiology), Hazards, Tissues (Biology), Absorption, Microwave frequency, Thermal radiation, Reproductive system, Eye, Medical examination, Laboratory animals, Humans

Conclusions: The effect of electromagnetic radiation is thermic, and overexposure is directly related to excessive heating and consequent temperature rise. The amount of temperature rise during exposure depends on at least 5 factors: (1) Specific area or areas of the body which are exposed to irradiation and the efficiency of their mechanism to dissipate the heat; (2) Field intensity of radiating energy; (3) Length of time of exposure; (4) Specific frequency or wavelength of radiations; and (5) Thickness of the skin and sub-tissues. Since animals were used in all observations and tests, the difficulty in correlating the information obtained as related to humans is evident. (Author)

AD-624 230 Fld. 6/18
CFSTI Prices: HC $1.00 MF $0.50
NEW YORK UNIV N Y SCHOOL OF ENGINEERING AND SCIENCE
ANOTHER FACTOR TO BE CONSIDERED IN ENVIRONMENTAL TESTING 'X-RADIATION'.
Jan 63, 18p. Rept. no. sete-228/3
Contract NObsr-89288 Proj. SETE
Unclassified report

Descriptors: (*X-rays, Health physics instrumentation), (*Heath physics instrumation, X-rays), (*Radiation hazards, Electron tubes), Radio fields, Pulse generators, Dosimeters, Radiation monitors, Effectiveness, Magnetrons, Klystrons, Thyratrons, Traveling-wave tubes, Diodes (Electron tubes), Cathode ray tubes, Measurement, Voltage, Errors

The accurate detection and measurement of the xradiation produced by high voltage Pulsed RF tubes involves problems of dosimetry different from the detection of similar radiation from conventional x-ray tubes or from radioactive materials. One cause of this difficulty is that the x-radiation is the by-product which is produced simultaneously with the RF energies. RF energy may produce strong potential gradients within the x-ray detector and its associated circuitry, resulting in an erroneous indication of the x-radiation intensity. Unless the x-ray detector has an inherently low sensitivity to RF energies, the RF shielding required may greatly attenuate the low energy levels of x-radiation before it reaches the detector, making the detecting instrument quite insensitive to the lower energy x-radiation. Any shielding based on these readings will be insufficient and provide a false sense of protection. Since the x-radiation produced by these high voltage RF tubes is generated in very short pulses, the average x-radiation may be relatively low. Most of the detectors described measure the average xradiation intensity, herefore, the reading may be off as much as 1/ luty cycle. (Author)

AD-624 127 **See Fld. 18/4**

AD-624 202 **See Fld. 18/4**

6/19. STRESS PHYSIOLOGY

AD-623 724 Fld. 6/19, 6/16
CFSTI Prices: HC $2.00 MF $0.50
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
BODY FLUID VOLUMES AND THE RENAL RESPONSE OF HUMAN SUBJECTS TO WATER IMMERSION.
Final rept. for Oct-Dec 64,
by Michael McCally. Aug 65, 32p. Rept. no. amrl-TR-65-115
Proj. AF-7222
Unclassified report

Descriptors: (*Body fluids, Adaptation (Physiology)), (*Urinary system, Adaptation (Physiology)), Water, Volume, Kidneys, Urine, Excretion, Cardiovascular system, Respiratory system, Hydrodynamics, Pressure breathing, Diving, Stress (Physiology), Osmosis, Biophysics, Physiology, Humans

Immersion of human subjects in water is used to simulate various aspects of the aerospace environment, including weightlessness. However, little is known of the physiological cardiovascular and renal responses to immersion. Such data are necessary before responses to immersion can be related to other environments, such as aerospace. The excretion of water and solute by the kidney is the fundamental mechanism for preserving the constancy of the mammalian extracellular fluid. The mechanisms by which the kidney is notified to retain or excrete water and solute in response to changes in the environment have been defined in considerable detail in recent years. The response of the kidney to water immersion of human subjects, as measured by water and solute excretion, provides a fascinating model for the study of body fluid volume regulation. The Ama divers of Japan and Korea represent specific problems of body fluid volume regulation during immersion as dictated by the depth, duration, temperature, and respiratory mechanics of their particular immersion pattern. (Author)

AD-623 919 Fld. 6/19
CFSTI Prices: HC $2.00 MF $0.50
BERGEN UNIV (NORWAY) PHYSIOLOGICAL INST
STRENUOUS MUSCULAR EXERTION IN THE POLAR CLIMATE AND ITS EFFECT UPON HUMAN WORK CAPACITY AND TOLERANCE TO COLD.
Final rept.,
by K. Lange Andersen, Bjorn Hellstrom, and Rolf Eide. 31 Jan 65, 38p. Contract AF-EOAR-64-58 AFOSR 65-1565
Unclassified report

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Polar regions, Tolerances (Physiology)), (*Stress (Physiology), Polar regions), Arctic regions, Exercise, Physical fitness, Acclimatization, Exposure, Body temperature, Cardiovascular system, Blood pressure, Metabolism, Norway

The physiology of eight men who participated in a polar ice cap expedition was investigated with regard to work capacity and cold tolerance. Several test were administered to the subjects before and after the expedition such as tests of cold tolerance and exercise fitness. A delay in the retesting made it difficult to accurately evaluate the results, but in general the study confirms earlier observa-

tions on how a period of cold exposure and hard physical work affects aspects of physiology underlying tolerance to cold. (Author)

AD-624 044 Fld. 6/19, 5/10
CFSTI Prices: HC $1.00 MF $0.50
TEXAS CHRISTIAN UNIV FORT WORTH INST OF BEHAVIORAL RESEARCH
COLD STRESS: PARAMETERS, EFFECTS, MITIGATION.
Rept. for Jan 60-Dec 64,
by Nurhan Findikyan, and S. B. Sells. Sep 65, 19p. Contract AF41 (657)-323 Proj. AF-8243 Task 824311
AAL TR-65-5

Unclassified report

Descriptors: (*Tolerances (Physiology), Polar regions), (*Stress (Physiology), Polar regions), (*Polar regions, Stress (Physiology)), Body temperature, Stress (Psychology), Adaptation (Physiology), Reaction (Psychology), Adjustment (Psychology), Exposure, Performance (Human), Protective clothing, Diet, Personnel, Selection, Leadership, Training, Attitudes, Acclimatization, Meteorological parameters, Personality, Physical fitness, Psychometrics

The complex interaction of cold stress with environmental and organismic variables in exercising influence on human performance is a problem that still requires extensive investigation. Some relatively well-known interactions of cold with other stressors are reviewed. A description of the functioning of thermoregulative mechanisms in relation to cold stress and cold injury as a result of exposure in extreme climates is presented. Ways and means of counteracting cold stress to improve task performance are emphasized. The literature relating personnel selection, acclimatization, training, indoctrination, leadership, morale, and physical protection to the mitigation of cold stress and to measures of performance effectiveness is reviewed. Despite the paucity of meaningful data, it is felt that adequate and encouraging progress is being made in the understanding of the psychophysiology of cold stress. (Author)

AD-624 144 Fld. 6/19, 5/10
CFSTI Prices: HC $2.00 MF $0.50
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
A REVIEW OF THE EFFECTS OF HIGH AMBIENT TEMPERATURE ON MENTAL PERFORMANCE.
Final rept. 1964-Jan 65,
by John F. Wing. Sep 65, 40p. Rept. no. amrl-TR-65-102
Proj. AF-1710 Task 171002

Unclassified report

Descriptors: (*Performance (Human), Temperature), (*Temperature, Performance (Human)), Stress (Physiology), Stress (Psychology), Exposure, Heat tolerance, Thresholds (Physiology), Tolerances (Physiology), Decision making, Reaction (Psychology), Memory, Behavior, Analysis of variance

Fifteen experiments done in various laboratories have assessed the effects of high thermal stress on mental performance. These experiments represent different combinations of exposure time and effective temperature. These studies were reviewed, and the upper thermal limit for unimpaired mental performance was found to vary systematically with exposure duration. Specifically, the lowest test temperatures yielding statistically-reliable decrements in mental performance decline exponentially as exposure durations are increased up to 4 hours. When this temperatureduration curve for mental performance is compared with physiological tolerance curves, it is found to lie well below them at every point in time. (Author)

AD-624 196 Fld. 6/19
CFSTI Prices: HC $2.00 MF $0.50
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
HUMAN PERFORMANCE DURING VIBRATION,
by Charles S. Harris, and Richard W. Shoenberger. Nov 65, 28p. Rept. no. amrl-TR-65-204
Proj. AF-1710 Task 171002

Unclassified report

Descriptors: (*Performance (Human), Vibration), (*Vibration, Performance (Human)), Acceleration, Performance tests, Tracking, Acceleration tolerance, Visual acuity, Vestibular apparatus, Tolerances (Physiology), Behavior

The report discusses the experimental approaches to the study of human performance during vibration. In addition, the characteristics of mechanical bodily responses to vibration at different frequencies are discussed, and human performance studies of the effects of vibration are compared with recommended long time tolerance curves. (Author)

AD-623 786 **See Fld. 6/20**

AD-623 936 **See Fld. 5/10**

AD-623 967 **See Fld. 5/9**

6/20. TOXICOLOGY

AD-623 786 Fld. 6/20, 6/15, 6/19, 6/5
CFSTI Prices: HC $2.00 MF $0.50
CALIFORNIA UNIV LOS ANGELES BRAIN RESEARCH INST
1, 1-DIMETHYLHYDRAZINE EFFECTS ON CENTRAL EXCITATORY AND INHIBITORY MECHANISMS IN CATS.
Final rept. Jan 64-Jun 65,
by M. D. Fairchild, and M. B. Sterman. Aug 65, 41p. Contract AF41 (609)-2329 Proj. AF-6302 Task 630202
AMRL TR-65-142

Unclassified report

Descriptors: (*Dimethyl hydrazine (1-1), Central nervous system), Electroencephalography, Brain, Behavior, CNS stimulants, CNS depressants, Amphetamines, Barbiturates, Chlorpromazine, Convulsive disorders, Toxicity, Cats

Experiments, using cats with chronically implanted brain electrodes, were performed to explore the influence of subconvulsive doses of 1, 1-dimethylhydrazine (UDMH) on certain excitatory and inhibitory mechanisms in the central nervous system (CNS). The cats were stimulated electrically in the midbrain reticular activating system, the basal forebrain inhibitory area, and both areas simultaneously while the animal was tested for performance in a positively reinforced experimental situation. UDMH was compared with amphetamine, chlorpromazine and phenobarbital both in the presence and absence of CNS stimulation. UDMH acted in a manner similar to chlorpromazine in subconvulsive doses in these tests. The most interesting and consistent effect of UDMH was to abort performance when the basal forebrain inhibitory area was stimulated. The animals resumed performance when the stimulus was terminated. UDMH has detectable CNS effects at doses well below convulsive levels. (Author)

7/2. INORGANIC CHEMISTRY

AD-623 708 Fld. 7/2, 7/3
MICHIGAN STATE UNIV EAST LANSING DEPT OF CHEMISTRY
STUDIES ON THE CHEMISTRY OF HALOGENS AND OF POLYHALIDS. XXV. NEW POLYHALIDE COMPLEX IONS,
by Yoshiharu Yagi, and Alexander I. Popov. 1965, 4p. AROD 4424:2

Unclassified report

See also AD-622 134.

Availability: Published in Inorg. Nucl. Chem. Letters V1 N1 P21-4 1965. Copies to DDC users only.

Descriptors: (*Complex compounds, Halides), (*Halides, Complex compounds), (*Pyridines, Complex compounds), Chlorine compounds, Iodine compounds, Physical properties, Molecular structure, Spectra (Infrared), Halides, Polymers, Ions

A series of complexes of the type R.HCl2.ICl were isolated from preparations of dichloroiodide salts and their infrared spectra were studied in an effort to elucidate their structure.

AD-624 073 Fld. 7/2, 7/3
OHIO STATE UNIV COLUMBUS DEPT OF CHEMISTRY
TRIGONAL-BIPYRAMIDAL NICKEL (II) COMPLEXES CONTAINING SULFUR LIGAND ATOMS,
by G. Dyer, and Devon W. Meek. 27 May 65, 5p. Contract DA-ARO (D)-31-124-G500
AROD 4486:2

Unclassified report

Availability: Published in Inorganic Chemistry V4 N10 P1398-1402 Oct 1965. Copies to DDC users only.

Descriptors: (*Complex compounds, Nickel compounds), (*Nickel compounds, Complex compounds), (*Sulfur compounds, Complex compounds), Phosphines, Organic sulfur compounds, Iodides, Bromides, Chlorides, Thiocyanates, Absorption spectrum, Electron transitions, Spectra (Visible ; ultraviolet), Molecular energy levels, Arsines, Pyrimidines

A new tetradentate ligand, tris (o-methylthiophenyl) phosphine, P (o-C6H4SCH3)3 (TSP, I), forms a series of crystalline, intensely-colored, trigonal-bipyramidal nickel (II) complexes containing the species Ni (TSP)X (+) (X = I, Br, Cl, or NCS) or Ni (TSP)L (2+) (L = thiourea, triphenylphosphine, or methyldiphenylphosphine). The two lowest energy electronic absorption bands in the visible and ultraviolet spectra have been assigned to the two (1)A1 to (1)E(D) transitions. Under similar conditions, the analogous arsine compound, tris (o-methylthiophenyl) arsine, As (o-C6H4SCH3)3 (TSA), did not react with nickel (II) salts. (Author)

AD-624 178 Fld. 7/2
NORTH CAROLINA UNIV CHAPEL HILL DEPT OF CHEMISTRY
THE NATURE OF VANADATE (V) SOLUTE SPECIES IN ALKALINE SOLUTION,
by Derek B. Copley, A. K. Banerjee, and S. Y. Tyree Jr.. 24 May 65, 3p. Contract DA-ARO (D)-31-124-G364 AROD 3741:5

Unclassified report

Availability: Published in Inorganic Chemistry V4 N10 P1480-2 Oct 1965. Copies to DDC users only.

Descriptors: (*Vanadates, Molecular association), Sodium compounds, Solutions, Light, Scattering, pH, Bases (Chemistry)

Light-scattering measurements were made on two series of sodium vanadate solutions, the total vanadium concentration being varied from 0.01 to 0.20 M. The first series was made up with a sodium to vanadium molar ratio of 1:1, corresponding to what is referred to commonly as sodium metavanadate, and is found to be tetrameric, in agreement with most previous findings. The second series contained a sodium to vanadium molar ratio of 2:1, corresponding to sodium pyrovanadate, and is found to be dimeric. (Author)

AD-624 179 Fld. 7/2
NORTH CAROLINA UNIV CHAPEL HILL DEPT OF CHEMISTRY
A LIGHT-SCATTERING STUDY OF ACIDIFIED SODIUM TUNGSTATE SOLUTIONS,
by Howard R. Craig, and S. Y. Tyree Jr.. 1 Feb 65, 5p. Contract DA-ARO (D)-31-124-G364 AROD 3741:4

Unclassified report

Availability: Published in Inorganic Chemistry V4 N7 P997-1001 Jul 1965. Copies to DDC users only.

Descriptors: (*Tungstates, Molecular association), Sodium compounds, Solutions, Light, Scattering, Ions, pH, Acids, Chemical equilibrium

Upon acidification with strong acid at room temperature the aggregation of normal tungstate ions to isopolytungstate ions is shown to result in unstable, yet very long halflived polyions. The average degree of aggregation of the species formed at H (+):WO4 (2-) of 9:6 is sixteen. The solutions come to equilibrium at 50C in about 6 days. Acidification of normal tungstate ions with acetic acidacetate buffer does not give rise to the large, unstable isopolyanions, but results, in the 9:6 solutions, in rapid formation of the equilibrium dodecatungstate ion. (Author)

AD-624 054 **See Fld. 7/4**

AD-624 181 **See Fld. 7/4**

7/3. ORGANIC CHEMISTRY

AD-623 701 Fld. 7/3
YALE UNIV NEW HAVEN CONN DEPT OF CHEMISTRY
THE SOLVOLYTIC BEHAVIOR OF TRICYCLO/ 3.2.1.0 (2,4)/- OCTANE DERIVATIVES,
by Kenneth B. Wiberg, and George R. Wenzinger. 18 Feb 65, 8p. AROD 3626:7

Unclassified report

Prepared in cooperation with Washington Univ., Seattle. Dept. of Chemistry.

Availability: Published in Journal of Organic Chemistry V30 P2278-84 1965. Copies to DDC users only.

Descriptors: (*Cyclooctane derivatives, Decomposition), (*Stereochemistry, Cyclooctane derivatives), Solutions, Alcohols, Terpenes, Acetates, Ions, Chemical bonds, Molecular isomerism, Ketones

The four possible tricyclo /3.2.1.0 (2,4)/ octan-6-ols were prepared and converted to their respective brosylates. Acetolysis of three of the four isomers gave identical products, exo-exo-Tricyclo /3.2.1.0 (2,4)/Octan-6-yl acetate, exo-bicyclo / 3.2.1/Oct-3-en-6-yl acetate, and nortricyclane-3-methyl acetate. The related nortricyclane3-methyl brosylate gave qualitatively the same products. The isomerization of endo-exo-Tricyclo/3.2.1.0 (2,4,)/ Octan-6-yl brosylate to the exo-exo isomer during the course of solvolysis leads to the conclusion that a 'norbornyl-type ion' is produced in this system. A consideration of the products and their ratios along with the kinetic data leads to a tentative scheme for the solvolysis of these compounds. (Author)

AD-623 702 Fld. 7/3
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
STUDIES IN STEREOCHEMISTRY. XXXII. MODELS FOR 1,2-ASYMMETRIC INDUCTION,
by Donald J. Cram, and Donald R. Wilson. 2 Nov 62, 6p. AROD 3632:3

Unclassified report

Availability: Published in Journal of the American Chemical Society V85 P1245-9 1963. Copies to DDC users only.

Descriptors: (*Stereochemistry, Models (Simulations)), (*Glycols, Stereochemistry), (*Butanols, Stereochemistry), Molecular isomerism, Synthesis (Chemistry), Organic solvents, Temperature, Aromatic compounds, Alcohols, Halides, Butanones, Acetones

The effect of solvent, reagent and temperature on stereospecificity and steric direction was investigated in the synthesis of 2,3-diphenyl-2,3-butanediols from 1,2-diphenyl2-hydroxy-1-propanone and 3-hydroxy-3-phenyl-2butanone, and in the synthesis of 2,3-diphenyl-3-methoxy2-butanols from 1,2-diphenyl-2-methoxy-1-propanone and 3-methoxy-3-phenyl-2-butanone. The results were interpreted on the basis of cyclic, openchain and dipolar models which control conformation and the balance of products. Appropriate manipulation of structure and environmental factors can produce results in conformity with expectations based on any one of the three models. (Author)

AD-623 705 Fld. 7/3
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
STUDIES IN STEREOCHEMISTRY. XXXIV. VARIATION OF CARBONIUM ION STRUCTURE WITH VARIATION IN ORIGIN,
by Donald J. Cram, and Melville R. V. Sahyun. 2 Nov 62, 9p. AROD 3632:5

Unclassified report

See also AD-623 857.

Availability: Published in Journal of the American Chemical Society V85 P1257-63 1963. Copies to DDC users only.

Descriptors: (*Stereochemistry, Ions), (*Alkenes, Stereochemistry), Acetic acid, Chlorides, Acetates, Alcohols, Amines, Hydrazine derivatives, Molecular isomerism, Chemical equilibrium, Protons, Elimination reactions, Reaction kinetics, Molecular structure, Monocyclic compounds

The 2-phenyl-2-butyl cation was generated in glacial acetic acid at 50C by a variety of means, and the ratios to total olefin of the cis- and trans- 2-phenyl-2-butenes and of 2-phenyl-1-butene were measured. With 2-phenyl2-butyl chloride, acetate, alcohol, amine (diazotized) and hydrazine as starting materials, the amount of cis-olefin varied from 70-40%; trans, from 1-9%; terminal, from 16-60%. The more basic the leaving group, the lower the value of the ratio, cis/terminal. These results demonstrate that the leaving group remains associated with the carbonium ion formed long enough to affect seriously the behavior of that ion, and suggest that the leaving group in some cases abstracts a proton from the carbonium ion. The rates at which the three olefins went to their equilibrium mixtures and the compositions of the equilibrium mixtures were determined. The assumption was made that the same carbonium ion was generated by each olefin, and the proportion of each olefin produced by the carbonium ion was calculated to be 9% cis, 1% trans and 90% terminal. Under identical conditions 2-phenyl-2-butyl acetate gave 67% cis, 2% trans and 31% terminal. These data demonstrate that conformationally different 2-phenyl-2-butyl carbonium ions lose protons more rapidly than the conformations equilibrate. (Author)

AD-623 707 Fld. 7/3
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMISTRY
HALOMETHYL-METAL COMPOUNDS. II. THE PREPARATION OF GEM-DIHALOCYCLOPROPANES BY THE REACTION OF PHENYL (TRIHALOMETHYL) MERCURY COMPOUNDS WITH OLEFINS,
by Dietmar Seyferth, James M. Burlitch, Richard J. Minasz, Jeffrey Yick-Pui Mui, and Harry D. Simmons Jr.. 21 May 65, 12p. AROD 2832:24

Unclassified report

See also AD-623 539.

Availability: Published in Journal of the American Chemical Society, V87 N19 P4259-70 Oct 5 1965. Copies to DDC users only.

Descriptors: (*Metalorganic compounds, Halogen compounds), (*Cyclopropanes, Synthesis (Chemistry)), (*Mercury compounds, Metalorganic compounds), Molecular isomerism, Alkenes, Monocyclic compounds, Spectra (Infrared), Nuclear magnetic resonance, Halogenated hydrocarbons

Phenyl (trihalomethyl) mercury compounds react with olefins to give gem-dihalocyclopropanes in high yield. This new procedure does not involve trihalomethide ion as an intermediate, nor does it require basic reaction conditions. Thus the mercurial route allows the preparation of gem-dihalocyclopropanes from olefins which contain base-sensitive functional groups, which react with trihalomethide ion, or which are only poor nucleophiles. A number of examples are given to illustrate these advantages of the mercurial route in these specific cases over the Doering-Hoffmann and Wagner routes. The conversion of cis and trans olefins to gem-dihalocyclopropanes by the mercurial route occurs with retention of configuration. (Author)

AD-623 781 Fld. 7/3
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
EFFECT OF A FERROCENYL SUBSTITUTE ON THE FUNCTIONAL GROUPS IN THE BENZENE RING,
by A. N. Nesmeyanov, E. G. Perevalova, and R. V. Golovnya. 1965, 4p. Rept. no. f-TS-10072/ III ATIC-298672
TT 65-64559

Unclassified report

Vliyanie Ferrotsenilnogo Zamestitelya na Funktsionalnye Gruppy v Benzolnom Yadre, trans. of Akademiya Nauk SSSR, Doklady, v103 n1 p81-2 1955.

Descriptors: (*Ferrocenes, Dissociation), (*Benzenes, Ferrocenes), Acid-base equilibrium, pH, Phenols, Amines, Substitution reactions, Bases (Chemistry), USSR

The dissociation constants K-a and K-b were obtained for several ferrocenyl substituted benzoids and were compared with these constants for amino and hydroxy substituted benzoids. The K-b of p-Ferrocenylaniline is 3 times greater than that of aniline, and 17 times greater than that of p-aminodiphenyl (xenylamine); the K-b of m-ferrocenylanaline is 2/3 as great as the p- isomer. Similar results were obtained by the comparison of ferrocenylamine and ferrocenylphenol with phenol and p-hydroxydiphenyl (p-phenylphenol), indicating that the ferrocenyl group introduced into the benzene ring behaves as a distinctly expressed substitute of the first order.

AD-623 854 Fld. 7/3
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
MACRO RINGS. XXV. FATE OF CARBONIUM IONS HELD IN PI-CLOUDS OF BENZENE RINGS,
by Donald J. Cram, and Melvin Goldstein. 2 Nov 62, 13p. AROD 3632:7

Unclassified report

Availability: Published in Journal of the American Chemical Society V85 P1063-74 1963. Copies to DDC users only.

Descriptors: (*Benzenes, Molecular orbitals), (*Molecular orbitals, Benzenes), Ions, Decomposition, Acetates, Reaction kinetics, Solutions, Spectra (Visible +ultraviolet), Nuclear magnetic resonance, Toluenes, Stereochemistry

The fate of carbonium ions was examined when generated at different distances from, and over several positions in, the face of a benzene ring. The rates and products of acetolysis of systems I and II were found to vary in an interesting manner with changes in values of m and n. Both phenyl and hydrogen become involved as neighboring groups, in one case probably at the same time. Acetolysis of I (m = 3, n = 5) to give the corresponding acetate occurs with retention of configuration. (Author)

AD-623 855 Fld. 7/3
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
ELECTROPHILIC SUBSTITUTION AT SATURATED CARBON. XX. STEREOCHEMICAL FATES OF AMMONIUM CARBANIDE AND RELATED ION PAIRS,
by Donald J. Cram, and Lawrence Gosser. 1 Jun 64, 14p. AROD 3632:9
Unclassified report

Availability: Published in Journal of the American Chemical Society V86 P5445-57 1964. Copies to DDC users only.

Descriptors: (*Stereochemistry, Substitution reactions), (*Substitution reactions, Stereochemistry), (*Ammonium compounds, Stereochemistry), Fluorenes, Deuterated compounds, Exchange reactions, Molecular rotation, Catalysis, Solvents, Dielectric properties, Protons, Carbon, Dissociation, Ions

Optically pure 2- (N,N-dimethyl carboxamido) -9 methylfluorene deuterated ((-)-II-d) and nondeuterated ((-)-II-h) in the 9-position were prepared. The rate constants for base-catalyzed hydrogen-deuterium exchange between II and the medium were roughly compared with those for racemization. The data demonstrate that in solvents of low dielectric constant, the ammonium cation of an ammonium carbanide ion pair rotates and donates a proton back to carbon (where deuterium was originally) faster than dissociation occurs. In tetrahydrofuran with triethylamine as base (no obvious proton donors), racemization without exchange is the dominating process. In solvents of high dielectric constant, ion-pair dissociation is faster than ion rotation and ion-pair collapse. In proton-donating solvents of high dielectric constant with a nonproton-donating base (a tertamine), the carbanion of the ion pair is inverted by proton capture from the face of the carbanion remote from the cation. (Author)

AD-623 856 Fld. 7/3
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
STUDIES IN STEREOCHEMISTRY. XXXV. MECHANISM OF E; REACTION OF AMINE OXIDES,
by Melville R. V. Sahyun, and Donald J. Cram. 2 Nov 62, 7p. AROD 3632:6
Unclassified report

See also AD-623 705.

Availability: Published in Journal of the American Chemical Society V85 P1263-8 1963. Copies to DDC users only.

Descriptors: (*Stereochemistry, Amines), (*Amines, Stereochemistry), (*Elimination reactions, Reaction kinetics), Monocyclic compounds, Oxides, Solvents, Drying, Thermochemistry, Pyrolysis, Alkenes, Heat of activation, Chemical bonds, Molecular isomerism, Chemical equilibrium

The first-order kinetics of the Ei (elimination) reaction of threo- and erythro-N,N-dimethyl-3-phenyl-2-butylamine oxide were measured in tetrahydrofuran-water and dimethyl sulfoxide-water mixtures as well as in the pure solvents. Variations in rates as great as 1,000,000 were observed as solvent was varied, the rates being lowest in water and highest in dry tetrahydrofuran. The rate was higher in wet dimethyl sulfoxide than in wet tetrahydrofuran because dimethyl sulfoxide acts as an internal drying agent and competes with amine oxide for the water present. From pure tetrahydrofuran to 50 mole % tetrahydrofuran-50 mole % water as solvent, a linear relationship between free energy of activation and log (1/NH2O) was observed. From pure dimethyl sulfoxide to 20 mole % dimethyl sulfoxide-80 mole % water as solvent, a linear relationship between free energy of activation and NH2O was found. The reaction was completely sterospecific in the cis sense over temperature ranges from 0C to 138C. Ratios of Kthreo/k-erythro ranged from 4.5 to 1.2, and K-conj./kunconj. from 50 to 6 as solvent was changed. (Author)

AD-623 857 Fld. 7/3, 11/9
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
STUDIES IN STEREOCHEMISTRY. XXXIII. APPROACHES TO MODELS FOR 1,3-ASYMMETRIC INDUCTION,
by Donald J. Cram, and Donald R. Wilson. 2 Nov 62, 10p. AROD 3632:4
Unclassified report

See also AD-623 702.

Availability: Published in Journal of the American Chemical Society V85 P1249-57 1963. Copies to DDC users only.

Descriptors: (*Stereochemistry, Models (Simulations)), (*Alkenes, Polymerization), (*Polymerization, Stereochemistry), Fluorenes, Polyethylene plastics, Molecular isomerism, Metalorganic compounds, Grignard reagents, Carbon dioxide, Formaldehyde

Systems were investigated that might serve as models for 1, 3-asymmetric induction in the anionic polymerization of olefins.

AD-623 858 Fld. 7/3
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
STRUCTURAL REQUIREMENTS FOR SECOND-ROWELEMENT FUNCTIONAL GROUPS TO PRESERVE ASYMMETRY OF CARBANIONS,
by Donald J. Cram, Robert D. Trepka, and P. St. 13 May 64, 4p. AROD 3632:8
Unclassified report

Availability: Published in Journal of the American Chemical Society V86 P2731-3 1964. Copies to DDC users only.

Descriptors: (*Stereochemistry, Ions), (*Exchange reactions, Reaction kinetics), (*Molecular rotation, Reaction kinetics), Organic sulfur compounds, Organic phosphorus compounds, Catalysis, Bases (Chemistry), Organic oxygen compounds, Molecular isomerism, Deuterated compounds

Values are reported for the ratio of rate constants of base-catalyzed hydrogen isotopic exchange to that of racemization for the following compounds with solvents containing the appropriate protium or deuterium reservoirs: CH3O- S (O2)- CH (CH3)- C6H13-n; C6H5N (CH3)- S (O2)- CH (CH3)- C6H13-n; C6H5-P (O) (K(+)O (-))- CH (CH3)- C6H13-n; K (+)O (-)- S (O2)- CH (CH3)C6H13-n; and (C2H5O)2P (O)- CH (CH3)- C6H13-n. The results indicate that functional groups which induce asymmetry have two unsubstituted oxygens bound to the second-row element, and those which do not have either one or three unsubstituted oxygens.

AD-623 870 Fld. 7/3, 7/4
CFSTI Prices: HC $2.00 MF $0.50
ROYAL INST OF TECH STOCKHOLM (SWEDEN) DEPT OF PHYSICS
DISSOCIATION OF ETHYLENE MOLECULE IONS FORMED IN CHARGE EXCHANGE COLLISIONS WITH POSITIVE IONS.
Scientific rept.,
by I. Szabo. 10 Sep 65, 28p. Rept. no. sr-2
Contract AF61 (052)-762 AFCRL 65-82
Unclassified report

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Ethylenes, Dissociation), (*Mass spectroscopy, Ethylenes), Ion exchange, Free radicals, Exchange reactions, Ions, Ionization, Alkynes, Molecular structure, Sweden

Mass spectra of ethylenes (C2H4 and CH2CD2) were obtained after charge exchange with slow positive ions. The intensities of the peaks were plotted as a function of the energy absorbed by the molecule during the charge exchange. The structure and dissociation of ethylene are discussed. Three distinct processes for the formation of the acetylene ion are proposed. Integration of the breakdown graph gives a mass spectrum in reasonable agreement with that obtained in electron impact. (Author)

AD-623 988 Fld. 7/3
DEFENCE CHEMICAL BIOLOGICAL AND RADIATION LABS OTTAWA (ONTARIO)
SOLVENT EFFECTS IN THE NUCLEAR MAGNETIC RESONANCE SPECTRA OF BENZALMALONONITRILES,
by M. A. Weinberger, R. M. Heggie, and H. L. Holmes. 15 Apr 65, 10p. Rept. no. dcbrl-462
Unclassified report

Availability: Published in Canadian Journal of Chemistry V43 P2585-93 1965. Copies to DDC users only.

Descriptors: (*Nitriles, Nuclear magnetic resonance), (*Nuclear magnetic resonance, Nitriles), Microwave spectroscopy, Solvents, Alkenes, Acetones, Benzenes, Benzaldehydes, Molecular isomerism, Canada

The nuclear magnetic resonance spectra of a series of substituted benzalmalononitriles were examined in various solvents. The chemical shifts for the olefinic protons are susceptible to large solvent effects which are interpreted as arising from association of a solvent molecule with the olefinic proton (acetone) or a site in its vicinity (benzene). With acetone this leads to a downfield shift from values observed in chloroform. In benzene solution the association produces increased shielding and is present in addition to a second solvation complex, the arrangement of which is governed by the substituent. The difference in behavior of the thylenic proton in benzalmalononitriles from the formyl proton in benzaldehyde is ascribed to its more highly acidic nature. (Author)

AD-624 006 Fld. 7/3, 7/4
STANFORD UNIV CALIF DEPT OF CHEMISTRY
INDUCTIVE EFFECTS ON THE POSITION OF A RING-CHAIN EQUILIBRIUM,
by Richard H. Eastman, and Kay Tamaribuchi. 16 Nov 64, 3p. Contract AF49 (638)-1272
Grant ,AF-AFOSR-62-116 AFOSR 65-1635
Unclassified report

Availability: Published in Journal of Organic Chemistry V30 P1671-1673 1965. Copies to DDC users only.

Descriptors: (*Succinic acids, Anhydrides), Electrons, Physical chemistry, Substitutes, Benzenes, Aromatic compounds, Chemical bonds

A Hammett study (L. P. Hammett, 'Physical Organic Chemistry,' McGraw-Hill, New York, 1940, Chapter 7) was made of the succinic acid-succinic anhydride equilibrium. Order-of-magnitude estimates of equilibrium data for 2,2-diethyl-3 - (p-X-phenyl) succinic acid and anhydrides set a scale

for judging the relative importance of bulk and inductive electronic effects. The substitution of three of the hydrogens in the chain of succinic acid favors the anhydride form by at least 5 kcal/mole. The effect of the substituents cannot be purely electronically inductive. The steric or bulk effect is much more important in driving the equilibrium toward the anhydride, and electron-injecting groups favor the anhydride form.

AD-624 087 Fld. 7/3
CFSTI Prices: HC $1.00 MF $0.50
MAREMONT CORP PASADENA CALIF RESEARCH DIV
RESEARCH ON CHEMICAL SYNTHESIS WITH MONOENERGETIC IONS.
Final technical rept., 1 Oct 60-30 Sep 64,
by C. Bodai, L. K. Branson, B. Chai, M. Farber, and N. G. Kim. 30 Sep 64, 19p. Contract AF49 (638)-913 AFOSR 65-1691

Unclassified report

Descriptors: (*Organic nitrogen compounds, Synthesis (Chemistry)), (*Nitrobenzenes, Synthesis (Chemistry)), (*Ion beams, Chemical reactions), Benzene, Toluenes, Ion bombardment, Electrostatics, Ion accelerators, Nitration

A new technique for the synthesis of chemical compounds was developed. Pure nitrobenzene was synthesized by bombarding the benzene molecule with a beam of NO2 (+) ions under carefully controlled conditions. Ortho, meta and para nitrotoluene were also prepared by the reaction of toluene with NO2 (+) ions. The apparatus used consists of an ion source capable of providing a lowenergy (1 electron volt) high-current (1 milliampere) beam of selected ionic species; an electrostatic potential control or accelerator for extracting the current from the source and giving accurate ion energies on the order of one electron volt; a reaction vessel in which the ions interact with the target molecules to produce a chemical reaction; and a cold trap to collect the products of reaction. (Author)

AD-624 169 Fld. 7/3, 8/1
IDAHO UNIV MOSCOW DEPT OF CHEMISTRY
SYNTHESIS OF BICYCLO/3.2.1/OCTA-3,6-DIEN-2-ONE: AN UNUSUAL VALENCE ISOMERISATION,
by P. K. Freeman, and D. G. Kuper. 8 Dec 64, 3p. Contract AF-AFOSR-34-63 Proj. AF-9762 Task 9762-02
AFOSR 65-1655

Unclassified report

Availability: Published in Chemistry and Industry P424-5 1965. Copies to DDC users only.

Descriptors: (*Cyclooctane derivatives, Synthesis (Chemistry)), (*Ketones, Synthesis (Chemistry)), Dienes, Molecular isomerism, Valence, Photochemistry, Polycyclic compounds

Bicyclo/3.1.0/hex-2-ene-6-endo-carboxylic acid chloride was treated with CH2N2. The crude endo-6diazomethyl carbonyl-bicyclo/3.1.0/hex-2-ene formed was photolyzed in tetrahydrofuran (THF) until 90% of the N was evolved. After THF was removed, chromatographic separation gave bicyclo/3.2.1/ octa-3, 6-dien-2one and tetracyclo(3.3.0.0 (4), 6)0 (2,8)/ octan-3-one. The reaction mechanism is shown. (Author)

AD-624 177 Fld. 7/3
IDAHO UNIV MOSCOW DEPT OF CHEMISTRY
REACTIVE INTERMEDIATES IN THE BICYCLO (3.1.0)HEXYL AND BICYCLO (3.1.0.)HEXYLIDENE SYSTEMS. II. THE CARBENOID DECOMPOSITION OF THE P-TOLUENESULFONYLHYDRAZONES OF 3-BICYCLO (3.1.0)HEXANONE AND 2-BICYCLO (3.1.0)HEXANONE,
by Peter K. Freeman, and Donald G. Kuper. 24 Aug 64, 3p. Contract AF-AFOSR-34-63 AFOSR 65-1654

Unclassified report

Availability: Published in Journal of Organic Chemistry V30 P1047-9 Apr 1965. Copies to DDC users only.

Descriptors: (*Cyclohexanones, Decomposition), (*Hydrazones, Cyclohexanones), Cyclohexenes, Alkenes

Sodium methoxide induced decomposition of the p-toluenesulfonylhydrazone of 3-bicyclo (3.1.0) hexanone produces bicyclo (3.1.0)hexene-2, while sodium methoxide induced decomposition of the p-toluenesulfonylhydrazone of 2-bicyclo (3.1.0) hexanone results in bicyclo (3.1.0)hexene-2, 1, 3-cyclohexadiene, 1-hexen-5-yne, 1, 2, 5-hexatriene, and trans-1,3,5-hexatriene. (Author)

AD-624 183 Fld. 7/3
NEW YORK UNIV N Y DEPT OF CHEMISTRY
THE REACTION OF CHLOROFORM AND SODIUM METHOXIDE WITH CYCLOOCTENE, 1,5CYCLOOCTADIENE AND 1, 3,6-CYCLOOCTATRIENE.
Revised ed.,
by David I. Schuster, and Fui-Tseng Lee. 8 Sep 65, 10p. Contract DA-ARO (D)-31-124-G425 AROD 4019:7

Unclassified report

Revision of manuscript submitted 27 Jul 65.

Availability: Published in Tetrahedron Letters N46 P4119-27 1965. Copies to DDC users only.

Descriptors: (*Cycloalkenes, Chemical reactions), (*Cyclooctane derivatives, Chemical reactions), Dienes, Chloroform, Sodium compounds, Nuclear magnetic resonance

AD-624 185 Fld. 7/3
STATE UNIV OF NEW YORK BUFFALO DEPT OF CHEMISTRY
1-ADAMANTYL-LITHIUM,
by Peter T. Lansbury, and Jack D. Sidler. 23 Jul 65, 2p. Contract DA-ARO (D)-31-124-G708 AROD 2650:8

Unclassified report

Availability: Published in Chemical Communications N16 NP Aug 25 1965. Copies to DDC users only.

Descriptors: (*Metalorganic compounds, Lithium compounds), (*Lithium compounds, Metalorganic compounds), Synthesis (Chemistry), Chemical reactions, Cycloalkanes, Polycyclic compounds

A report is given of the first preparation of 1-adamantyllithium (I) and also some observations on its tendency to give coupling products during formation, a consequence of the remarkable stability of the 1-adamantyl free-radical.

AD-624 205 Fld. 7/3, 2/2, 11/12
DEPARTMENT OF FORESTRY OTTAWA (ONTARIO)
LIGNIN MODEL COMPOUNDS. III. DETECTION OF 1-HYDROXY-1- (4-HYDROXY-3-METHOXYPHENYL)-2PROPANONE IN THE ACIDOLYSIS PRODUCTS OF LIGNIN,
by J. A. F. Gardner, and Harold MacLean. 30 Mar 65, 4p.

Unclassified report

Availability: Published in Canadian Journal of Chemistry V43 P2420-3 1965.

Descriptors: (*Lignin, Models (Simulations)), (*Acetones, Chemical analysis), (*Phenyl ethers, Chemical analysis), Alcohols, Hydrolysis, Acids, Wood, Canada

AD-623 704 See Fld. 7/4

AD-623 708 See Fld. 7/2

AD-623 981 See Fld. 6/5

AD-623 983 See Fld. 6/5

AD-623 984 See Fld. 6/5

AD-624 073 See Fld. 7/2

AD-624 117 See Fld. 8/1

AD-624 170 See Fld. 11/9

AD-624 171 See Fld. 11/9

7/4. PHYSICAL CHEMISTRY

AD-623 704 Fld. 7/4, 7/3
YALE UNIV NEW HAVEN CONN DEPT OF CHEMISTRY
A SCHEME FOR STRAIN ENERGY MINIMIZATION. APPLICATION TO THE CYCLOALKANES,
by Kenneth B. Wiberg. 15 Jul 64, 11p. AROD 3626:11

Unclassified report

Availability: Published in Journal of the American Chemical Society V87 P1070-8 1965. Copies to DDC users only.

Descriptors: (*Cycloalkanes, Chemical bonds), Energy, Strain (Mechanics), Molecular structure

A simple direct method for strain energy minimization which is indepent of the specific molecular geometry of a given case has been developed. The required molecular parameters have been estimated from the available thermodynamic, structural, and spectral data. The method has been applied to cyclooctane, cyclodecane, and cyclododecane. (Author)

AD-623 706 Fld. 7/4
MICHIGAN STATE UNIV EAST LANSING DEPT OF CHEMISTRY
THEORY AND APPLICATION OF CYCLIC VOLTAMMETRY FOR MEASUREMENT OF ELECTRODE REACTION KINETICS,
by Richard S. Nicholson. 3 Aug 65, 5p. Contract DA-31-124-ARO-D-308 AROD 5288:1

Unclassified report

Availability: Published in Analytical Chemistry V37 P1351-5 Oct 1965. Copies to DDC users only.

Descriptors: (*Electrodes, Reaction kinetics), (*Electrochemistry, Theory), (*Cadmium, Reduction (Chemistry)), Chemical analysis, Polarographic analysis, Oxidation-reduction reactions, Integral equations, Voltage, Test method

The theory of cyclic voltammetry was extended to include electron transfer reactions which are described by the electrochemical absolute rate equation. Results of theoretical calculations made it possible to use cyclic voltammetry to measure standard rate constants for electron transfer. Thus, a system which appears reversible at one frequency may be made to exhibit kinetic behavior at higher frequencies, as indicated by increased separation of cathodic and anodic peak potentials. The standard rate constant for electron transfer is determined from this peak potential separation and frequency. The method provides an extremely rapid and simple way to evaluate electrode kinetics. The reduction of cadmium is used as an illustration. (Author)

AD-623 837 Fld. 7/4, 20/6
CFSTI Prices: HC $3.00 MF $0.75
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF
INFRARED ABSORPTION IN HEATED AIR FROM VIBRATION-ROTATION BANDS OF NITRIC OXIDE,
by D. R. Churchill, and S. A. Hagstrom. Nov 64, 99p. Rept. no. 2-12-64-2
Contract Nonr-3368 (00) Proj. NR087-133
Unclassified report

Descriptors: (*Absorption spectrum, Nitrogen compounds), (*Nitrogen compounds, Oxides), (*Infrared spectroscopy, Nitrogen compounds), Air, Molecular spectroscopy, Band spectrum, Molecular rotation, Vibration, Infrared radiation, Wave transmission, Molecular energy levels, High-temperature research, Programming (Computers)

The contribution to the spectral absorption coefficient of heated air arising from the vibration-rotation bands of nitric oxide has been calculated with the aid of the SACHA digital computer programs. These band systems were theoretically reconstructed on a line-by-line basis using experimentally determined constants whenever these were available. A magnetic tape spectral atlas containing the reconstructed spectra was then employed by another computer program to calculate the average transmission of infrared radiation through a slab of heated NO whose occupation numbers were chosen to conform to the appropriate air case. Several parameters were varied in the calculation including the line half-width. Results of the calculations are contained in the form of graphs and tables. Computations were made for temperatures from 1000 K-5000 K and for densities of normal atmospheric to 0.0001 normal. Frequencies covered were between 1200/cm and 10,000/cm (wavelength = 1 micron-8.3 micron). (Author)

AD-623 838 Fld. 7/4
CFSTI Prices: HC $1.00 MF $0.50
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
ENERGY LEVELS OF THE COMPOUND STATE OF N2 NEAR 2.3 EV.
Technical rept.,
by G. J. Schulz, and H. C. Koons. 28 Oct 65, 9p. Rept. no. tr-30 ,65-9E3-113-P2
Contract Nonr-2584 (00) ,ARPA-Order-125-63
Proj. 4720
Unclassified report

Descriptors: (*Nitrogen, Atomic energy levels), (*Atomic energy levels, Nitrogen), Electron bombardment, Probability, Chemical bonds, Excitation

The energy levels of the compound state of N2 around 2.3 eV were determined from the structure in the elastic cross section. It is found that the spacing of this structure is in agreement with the vibrational spacing of the ground state of N2. (Author)

AD-623 839 Fld. 7/4
CFSTI Prices: HC $1.00 MF $0.50
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
FORMATION OF H (-) BY ELECTRON IMPACT ON H2 AT LOW ENERGY.
Technical rept.,
by G. J. Schulz, and R. K. Adundi. 29 Oct 65, 13p. Rept. no. 65-9E3-113-P3 ,TR-31
Contract Nonr-2584 (00) ,ARPA Order-125-63
Proj. NR-4720
Unclassified report

Descriptors: (*Hydrogen, Electron bombardment), (*Gas ionization, Hydrogen), Ions, Kinetic energy, Electron beams, Deuterium, Dissociation, Probability

The document reports the formation of the atomic hydrogen negative ion by electron impact on H2 very close to the theoretical threshold for the production of H (-) and H with zero kinetic energy via the process e + H2 yields H (-) + H. H (-) formation was found with a very sharp onset at an electron energy of 3.73 = 0.07 eV and a very steeply rising, albeit small, cross section which peaks very close to its onset. This observation leads to a better understanding of the potential-energy curves of the H2 (-) system and has a bearing on the interpretation of vibrational excitation in H2. (Author)

AD-623 906 Fld. 7/4, 20/12, 20/3, 11/6
CFSTI Prices: HC $4.00 MF $1.00
MASSACHUSETTS INST OF TECH CAMBRIDGE CENTER FOR MATERIALS SCIENCE AND ENGINEERING
INTERDISCIPLINARY LABORATORY PROGRAM.
Annual technical rept., 1964-1965.
1 Nov 65, 143p. Contract SD-90
Unclassified report

Descriptors: (*Chemistry, Scientific research), (*Physics, Scientific research), (*Metallurgy, Scientific research), Solid state physics, Electrical properties, Magnetic properties, Optical properties, Crystallography, Radiofrequency spectroscopy, Infrared spectroscopy, Semiconductors, Superconductors, Crystal lattice defects, X-ray diffraction analysis, Neutron diffraction analysis, Physics laboratories, Metallurgical laboratories

Contents: Chemical and solid state physics; Electronic, magnetic, and optical properties of materials and device applications; Metallurgy; Central facilitier.

AD-623 909 Fld. 7/4
CFSTI Prices: HC $2.00 MF $0.50
CORNELL UNIV ITHACA N Y LAB OF ATOMIC AND SOLID STATE PHYSICS
THE PHOTOIONIZATION CROSS SECTION OF SOME ATOMIC SYSTEMS.
Technical rept., rev.,
by Eugene J. McGuire. Sep 65, 47p. Rept. no. tr-12
Contract Nonr-401 (37)
Unclassified report

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Ionization, Probability), Valence, Excitation, Atomic orbitals, Ionization potentials, Atomic structure, Wave functions, Alkali metals, Helium group gases

The continuum orbitals developed in the proceeding paper are used with Hartree ground state orbitals to calculate the valence photoionization cross section of He, Li, Na, K, Rb, and Cs. Calculations are reported on the 4d shell photoionization cross section of Xe and the elements from In to Xe. These one electron calculations are truncated near the threshold for higher energy excitation. It is shown for Kr these higher energy excitations have a significant effect on the cross section. (Author)

AD-623 930 Fld. 7/4
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS SPACE PHYSICS LAB
ADSORPTION OF INORGANIC ANIONS ON A MERCURY ELECTRODE FROM SOLUTIONS IN FORMAMIDE. I. ADSORPTION OF IODIDE IONS.
Physical sciences research papers,
by Richard Payne. 23 Nov 64, 23p. Rept. no. psrp-147
Proj. AF-8659 Task 8659-04
AFCRL 65-70
Unclassified report

Availability: Published in Journal of Chemical Physics V42 N10 P3371-83 May 15 1965. Copies to DDC users only.

Descriptors: (*Iodides, Adsorption), (*Electrodes, Mercury), Potassium compounds, Formamide, Electrical double layer, Surface tension, Voltage, Concentration (Chemistry), Thermodynamics, Electrolytes, Films, Electrochemistry

The adsorption of the iodide ion on a mercury electrode from solutions of potassium iodide in formamide was studied by measuring the double-layer capacity and the interfacial tension as a function of potential and concentration at 25C. The adsorption can be described by a modified Langmuir (Frumkin) isotherm with a large lateral repulsive interaction energy, but examination of the inner-layer capacity suggests that the adsorbed layer behaves more like a twodimensional imperfect gas than an array of particles on localized sites implied by the Langmuir model. The amounts adsorbed are calculated and the capacity resolved into its component parts with the aid of the isotherm and diffuse-layer theory. The capacity of the inner region of the double layer measured at constant amount adsorbed is almost independent of the amount adsorbed and approximates to the inner-layer capacity for a nonadsorbed electrolyte, i.e., potassium fluoride. The relative distances from the interface of the inner and outer Helmholtz planes are calculated from the components of the capacity and compared with similar values for aqueous potassium iodide. (Author)

AD-623 940 Fld. 7/4, 4/1
CFSTI Prices: HC $1.00 MF $0.50
UNIVERSITY OF WESTERN ONTARIO LONDON MOLECULAR EXCITATION GROUP
RESEARCH DIRECTED TOWARDS THE STUDY OF ELECTRONIC STRUCTURE, BAND INTENSITIES AND MODES OF EXCITATION OF MOLECULAR SPECIES.
Final rept., May 64-Apr 65,
by R. W. Nicholls. 31 May 65, 25p. Contract AF19 (628)-4169 Proj. AF-4649 Task 464901
AFCRL 65-36
Unclassified report

Descriptors: (*Upper atmosphere, Molecular properties), (*Molecular orbitals, Upper atmosphere), (*Molecular spectroscopy, Upper atmosphere), Molecular structure, Band spectrum, Intensity, Excitation, Shock tubes, Plasma jets, Ion beams, Radiochemistry, Lasers, Potential theory, Wave functions, Gas ionization, Electron transitions, Probability, Canada

The experimental research programme embraces studies of: Intensity measurements on molecular band systems; Identification atlas of molecular spectra; Shock tube spectroscopy of powdered solids; Plasma jet spectroscopy; Ion beam spectroscopy; X-radiolysis of gases; Impact flash spectroscopy; Laser excitation of powdered solids. The theoretical research programme embraces studies of: Molecular potentials and vibrational wave functions; Derived quantities of vibrational Wave functions; Atomic collisions. Results of this research are reviewed with particular emphasis to applications to upper atmospheric physics. A list of the 35 papers resulting from the work is included.

AD-623 972 Fld. 7/4, 6/1, 8/1
CFSTI Prices: HC $1.00 MF $0.50
GEORGIA INST OF TECH ATLANTA ENGINEERING EXPERIMENT STATION
ELECTRON PARAMAGNETIC RESONANCE OBSERVATIONS OF TRIPLET STATES IN CHLOROPHYLL,
by G. T. Rikhireva, Z. P. Bribova, L. P. Kaishin, A. V. Umrikhina, and A. A. Krasnovskii. Jun 65, 7p. Rept. no. g-T-R-65-4
Contract AF19 (628)-5034 TT 65-64583
Unclassified report

Nabludenie Electronnogo Paramagnitnogo Rezonansa Tripletnogo Sostoyaniya Khlorofilla. Trans. of Akademiya Nauk SSSR. Doklady v159 n1 p196-7 1964.

Descriptors: (*Chlorophylls, Molecular energy levels), (*Molecular energy levels, Parametic resonance), Phosphorescence, Photosynthesis, USSR

AD-623 996 Fld. 7/4
CALIFORNIA INST OF TECH PASADENA DIV OF CHEMISTRY AND CHEMICAL ENGINEERING
SATURATED LIQUID DENSITY OF CARBON TETRAFLUORIDE FROM 90 DEGREES TO 150 DEGREES K,
by C. M. Knobler, and C. J. Pings. 1965, 2p.
Contract AF49 (638)-1273 ,Nonr-220 (40)
AFOSR 65-1638

Unclassified report

Availability: Published in Journal of Chemical and Engineering Data V10 N2 P129-30 Apr 1965.

Descriptors: (*Freons, Density), (*Carbon compounds, Fluorides), (*Fluorides, Carbon compounds), Halogenated hydrocarbons, Test methods

The saturated liquid density of carbon tetrafluoride has been measured at 16 temperatures between 90 and 150K. The data can be represented by the equation d (grams/cu cm)=2.254-0.00364 T -5.40 X 10 to the minus 6th power T squared with a standard deviation of 0.00071 grams/cu cm. (Author)

AD-624 002 Fld. 7/4
CALIFORNIA INST OF TECH PASADENA DIV OF CHEMISTRY AND CHEMICAL ENGINEERING
X-RAY ABSORPTION FACTORS FOR CYLINDRICAL SAMPLES IN ANNULAR SAMPLE CELLS EXPOSED TO INCIDENT BEAMS OF LIMITED WIDTH,
by A. P. Kendig, and C. J. Pings. 11 Sep 64, 10p.
Contract AF49 (638)-1273 Proj. AF-9710
Task 971003
AFOSR 65-1637

Unclassified report

Availability: Published in Journal of Applied Physica V36 N5 P1692-8 May 1965. Copies to DDC users only.

Descriptors: (*X-ray absorption analysis, Mathematical analysis), Line spectrum, Analysis of variance, Intensity, Beryllium, Cylindrical bodies, Liquids, Integrals

Expressions are derived for x-ray absorption factors for a liquid or amorphous sample confined within a cylindrical sample cell. Sufficient geometrical parameters are included in the formulation to cover many experimental cases of practical interest. Various integrals involved are formulated in numerical calculus formulas adaptable to digital computer procedures. The statistical error caused by subtracting the cell background from the scattering of a cell and sample can be reduced substantially by limiting the volume of the cell material irradiated. The absorption factors calculated apply to uniform beams only; the approximation of absorption factors for nonuniform beams is discussed. (Author)

AD-624 024 Fld. 7/4
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
POTENTIAL OF A PLATINUM ELECTRODE AT LOW PARTIAL PRESSURES OF HYDROGEN OR OXYGEN.
Interim rept.,
by T. B. Warner, and S. Schuldiner. 15 Apr 65, 13p. Rept. no. nrl-6244
Proj. SR-007-12-01-0809 ,RR-001-01-43-4754

Unclassified report

Descriptors: (*Platinum, Electrodes), (*Electrodes, Platinum), Hydrogen, Oxygen, Gas leaks, Electrochemistry, Surface properties, Solutions, Sulfuric acids

The open-circuit potential on birght platinum in 1M H2SO4 was studied as a function of oxygen or hydrogen partial pressure from .10 to 10 to the minus 7th power atm. The very low rates of H2 or O2 flow which were required were produced by a special gas generator. Potentials predicted by the Nernst equation for the H+/H2 couple were not observed below .0010 atm H2 partial pressure. A Nernst relation with a slope of 0.06 v per decade of O2 partial pressure was found. The O2 leak into the closed system used was found to be about 10 to the minus 7th power atm. Based on the assumption that dissolved O2 decreases the effective H2 partial pressure at the electrode surface, an equation was developed for obtaining the effective H2 partial pressure. (Author)

AD-624 025 Fld. 7/4
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
THE ADSORPTION OF N-OCTADECYLAMINE, N-OCTADECANOIC ACID, AND N-OCTADECYL ALCOHOL FROM NONAQUEOUS SOLUTION ONTO HYDRATED AND DEHYDRATED METAL OXIDE SURFACES.
Interim rept.,
by W. D. Bascom. 5 Oct 65, 16p. Rept. no. nrl-6315
Proj. RR-001-01-43-4750

Unclassified report

Descriptors: (*Organic compounds, Adsorption), (*Metals, Oxides), (*Surface properties, Oxides), Surface properties, Stainless steel, Iron, Nickel, Chromium, Platinum, Oxides, Amines, Alcohols, Carboxylic acids, Solvents, Hydrocarbons

A study has been made of the adsorption of the normal C18 amine, acid, and alcohol from hydrocarbon solution onto freshly polished stainless steel, iron, nickel, chromium, and platinum surfaces as a function of substrate pretreatment. The pretreatment consisted of maintaining the polished surface for 3 hours in a helium or air environment at selected temperatures ranging from ambient to 320C. Isolation of the monolayer-covered surface was accomplished by the method of retraction, and the degree of coverage was determined by measuring the contact angle. Treatment of the metal surface at temperatures from 25 to 200C resulted in a more-or-less continuous decline in ability to adsorb a close-packed monolayer of the amine. Above 200C, however, amine adsorption increased with increasing pretreatment temperature except on platinum. The regain in amine adsorption is believed to be connected with oxide film growth. In anhydrous solution neither the alcohol nor the acid formed a close-packed monolayer. On the other hand, it was possible to obtain a monolayer and even crystallites of octadecanoic acid when the substrate was heavily hydrated and the adsorbate solution was saturated with water. (Author)

AD-624 054 Fld. 7/4, 7/2, 20/12
CFSTI Prices: HC $1.00 MF $0.50
VIRGINIA UNIV CHARLOTTESVILLE DEPT OF AEROSPACE ENGINEERING
CATALYTIC AND CHEMICAL REACTION RATES OF HYDROGEN ATOMS WITH GERMANIUM.
Technical rept.,
by K. M. Sancier, S. R. Morrison, and H. U. D. Wiesendanger. Nov 65, 18p. Contract Nonr-3623 (00) Proj. SQUID ,NR-098-038

Unclassified report

Prepared in cooperation with Stanford Research Inst., Menlo Park, Calif., Technical rept. SRI-21-P.

Descriptors: (*Germanium, Catalysis), (*Hydrogen, Reaction kinetics), (*Semiconductors, Catalysis), (*Recombination reactions, Reaction kinetics), Germanium compounds, Hydrides, Single crystals, Doping, Electronic properties

The chemical and catalytic reactions between hydrogen atoms and the semiconductor germanium are investigated in order to examine the dependence of these reactions on the bulk electronic properties of the solid. Two reactions with gaseous hydrogen atoms were explored; viz., the catalytic recombination of hydrogen atoms on the semiconductor surface and the chemical reaction in which a volatile germanium hydride is produced. The recombination coefficient for hydrogen atoms on germanium was determined for crystals of different doping levels (both n-type and p-type). At 90 C, the recombination coefficient was found to be 0.25 = 0.06, and was essentially independent of the atom density in the gas and the doping level. The recombination coefficient could be correlated with the Debye temperature of the solid as found previously for metals. As the germanium temperature was increased from 90 C to 170 C, the recombination coefficient increased about 50%. The hydride formation reaction rate was found to be first-order with respect to the hydrogen atom density in the gas with a rate constant at 25 C of 1.4 = 0.2 cm/sec, independent of doping level. It is concluded that the bulk electronic properties of germanium, and probably also of silicon, do not appreciably affect either the catalytic properties for hydrogen atom recombination or the chemical properties for volatile hydride formation. (Author)

AD-624 113 Fld. 7/4, 20/13
CHICAGO UNIV ILL DEPT OF CHEMISTRY
HEATS OF FORMATION OF SOLID SOLUTIONS IN THE SYSTEMS (NA-AG)CL AND (NA-AG)BR,
by O. J. Kleppa, and S. V. Meschel. 3 May 65, 7p. Contract DA-ARO (D)-31-124-G616
AROD 5107:1

Unclassified report

Availability: Published in Journal of Physical Chemistry V69 N10 P3531-7 Oct 1965. Copies to DDC users only.

Descriptors: (*Solid solutions, Heat of formation), (*Heat of formation, Solid solutions), (*Silver compounds, Solid solutions), (*Sodium compounds, Solid solutions), Chlorides, Bromides, Calorimetry, Enthalpy, Mixtures, Molecular association, Silver alloys, Sodium alloys

The heats of formation of solid solutions in the systems (Na-Ag) Cl (I) and (Na-Ag) Br (II) were determined by high-temperature solution calorimetry at 350C with pure liquid silver nitrate as the solvent. The molar enthalpies of formation may be represented analytically by the expressions X (1-X) (2.50 + 0.41X) kcal./mole for (I), and X (1-X) (1.91 + 0.72X) kcal./mole for (II). Here X represents the mole fraction of the sodium halide. The results are compared with data for the liquid mixtures. In each case the solid solutions have larger positive enthalpies of formation than the liquid solutions, the chlorides are more endothermic than the bromides, and the bromide system has a larger energetic asymmetry than the corresponding chloride system. Both for the solid and liquid mixtures the enthalpies of formation are believed to arise mainly from the van der Waals-London interaction between second nearest neighbor cations. (Author)

AD-624 126 Fld. 7/4, 11/6, 20/12, 11/7
CFSTI Prices: HC $4.00 MF $0.75
PENNSYLVANIA UNIV PHILADELPHIA LAB FOR RESEARCH ON THE STRUCTURE OF MATTER
ANNUAL TECHNICAL REPORT (5TH), JULY 1, 1964 JUNE 30, 1965,
by John N. Hobstetter. 30 Jun 65, 121p. Contract SD-69

Unclassified report

See also N65-24420.

Descriptors: (*Materials, Scientific research), (*Chemical analysis, Reviews), (*Solid state physics, Reviews), (*Metallography, Reviews), Synthesis (Chemistry), Molecular structure, Chemical properties, Thermodynamics, Reaction kinetics, Phase studies, Crystal lattice defects, Molecular orbitals, Spectroscopy, Electrical properties, Magnetic properties, Transport properties, Optical properties, Mechanical properties

Summaries are given of research progress and results in the following areas: Synthesis and structure studies; chemical and thermodynamic properties; kinetics and phase transformations; crystal defects and defect mechanism; electronic structure and fundamental interactions; electric, magnetic and transport properties; optical properties; mechanical properties. Also included are listings of LRSM academic staff members; research centers; PhD. and M.S. degrees conferred; publications; seminars/ symposia.

AD-624 134 Fld. 7/4, 11/6
CFSTI Prices: HC $2.00 MF $0.50
SPRINGFIELD ARMORY MASS
A SPECTROSCOPIC, POINT-TO-PLANE METHOD OF ANALYSIS FOR TITANIUM-ALLOYS.
Technical rept.,
by R. A. Reid. 17 Sep 65, 26p. Rept. no. sa-TR16-1123
Proj. AW-3-R1103-01-AW-M6
Unclassified report

Descriptors: (*Titanium alloys, Spectroscopy), (*Spectroscopy, Quantitative analysis), Aluminum alloys, Chromium alloys, Iron alloys, Manganese alloys, Molybdenum alloys, Vanadium alloy, Spectrum analyzers

A spectroscopic, point-to-plane method of analysis has been developed for titanium alloys containing aluminum, chromium, iron, manganese, molybdenum, and vanadium. A direct-reading spectrometer with a high-voltage source provided the high-voltage spark for excitation. Results were obtained from a sequential read-out system and converted to analytical curves. Spectroscopic titanium samples, obtained from the National Bureau of Standards, and graphite pins were used. Representative coefficients of variation and results are presented. (Author)

AD-624 149 Fld. 7/4
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
CATHODIC PRETREATMENT EFFECTS ON THE BEHAVIOR OF A PLATINUM ELECTRODE.
Interim rept.,
by S. Schuldiner, and T. B. Warner. 28 Apr 65, 8p. Rept. no. NRL-6263
Proj. SR-007-12-01-0809 ,RR-001-01-43-4754
Unclassified report

Descriptors: (*Electrodes, Contamination), (*Hydrogen, Electrochemistry), (*Platinum, Electrodes), Cathodes (Electrolytic cell), Polarization, Carbon monoxide, Sulfuric acid, Electrolysis, Anodes (Electrolytic cell), Voltage, Oxygen, Adsorption

Hydrogen formed by cathodic polarization of a bright Pt electrode in CO-saturated 1M H2SO4 is shown to remain associated with the electrode for relatively long periods of time. Such hydrogen causes unusual opencircuit potential behavior after anodic pulses and can give characteristic hydrogen regions in anodic charging curves. Bringing the electrode potential to a value where hydrogen is normally thought to be absent does not assure that all the hydrogen is removed. (Author)

AD-624 181 Fld. 7/4, 7/2, 20/13
CALIFORNIA STATE COLL LONG BEACH DEPT OF CHEMISTRY
HEATS OF MIXING OF 1 TO 1 ELECTROLYTES IN METHANOL-WATER SOLUTIONS. HCL-NACL, LICL-NACL, KCL-NACL, AND HCL-KCL SYSTEMS AT 25,
by J. H. Stern, and C. W. Anderson. 5 Oct 64, 3p. AROD 3956·6
Unclassified report

Availability: Published in Journal of Chemical and Engineering Data V10 N2 P136-8 Apr 1965. Copies to DDC users only.

Descriptors: (*Electrolytes, Heat of solution), (*Chlorides, Mixtures), (*Heat of solution, Electrolytes), Hydrochloric acid, Lithium compounds, Sodium compounds, Potassium compounds, Solutions, Solvents, Water, Methanols, Thermochemistry, Calorimetry

Heats of mixing of equimolal 1 molal solutions of HCl-NaCl, LiCl-NaCl, KCl-NaCl, and HCl-KCl in methanolwater as a function of solute mole fraction were determined calorimetrically at 25C. The heats are compared with similar studies on the same electrolyte systems in pure water. Significant differences were observed. HCl-NaCl is comparable in magnitude but the curve exhibits considerable asymmetry, while the symmetric thermal interactions of LiCl-NaCl and KCl-NaCl are about twice those observed in pure water. An inversion of heats was observed for the HCl-KCl system. (Author)

AD-624 184 Fld. 7/4
INDIANA UNIV BLOOMINGTON DEPT OF CHEMISTRY
PRELIMINARY ELECTRON-DIFFRATION STUDY OF H2 AT SMALL SCATTERING ANGLES,
by R. A. Bonham, and T. Iijima. 15 Sep 64, 4p.
Contract AF-AFOSR-602-64 Proj. AF-9760
Task 976002
AFOSR 65-1673
Unclassified report

Availability: Published in Journal of Chemical Physics V42 N7 P2612-4 Apr 1 1965. Copies to DDC users only.

Descriptors: (*Electron diffraction analysis, Hydrogen), Helium, Wave functions, Molecular orbitals

Sector electron-diffraction patterns of H2 and He were obtained over the range $1 < \text{or} = s < \text{or} = 8$. The chamber pressure was maintained at 0.0002 mm-Hg. Comparison of experimental intensity curves with theoretical curves indicated that the intensity curve for H2 was in much better agreement with the curve calculated by using the Weinbaum wave function than with the curve deduced from the independent atom model. This result implies that the scattering experiment is sensitive mainly to the contraction of volume occupied by a fixed percentage of the electrons in the molecule when a chemical bond is formed. (Author)

AD-624 210 Fld. 7/4, 20/12
JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF CHEMISTRY
ENVIRONMENTAL PERTURBATIONS ON FOREIGN ATOMS AND MOLECULES IN SOLID ARGON, KRYPTON AND XENON,
by Maclyn McCarty Jr., and G. Wilse Robinson.
4 Aug 59, 17p. Contract NSF-G6227
Unclassified report

Availability: Published in Molecular Physics V2 N4 P415-30 Oct 1959. Copies to DDC users only.

Descriptors: (*Perturbation theory, Helium group gases), (*Helium group gases, Solidified gases), Impurities, Absorption spectrum, Crystal lattices, Cryogenics, Argon, Krypton, Xenon, Vibration, Sodium, Mercury, Carbon, Amides, Imides, Free radicals

Perturbations which are responsible for the shifts of electronic and vibrational spectra of species trapped in a solid are considered in terms of the intermolecular potential which describes interactions between these species and neighbouring atoms. It is shown that in certain instances London's theory can give an adequate approximation to the dispersion energy between an electronically excited species and a rare gas atom. The experimental shifts in the electronic absorption spectra of Hg, NH and C2 at lattice sites in rare gas crystals at 4.2K are explained quantitatively on the basis of a Lennard-Jones (6-12) or (6-8-12) potential between the trapped species and the rare gas atoms. The theory does not adequately explain the shifts in those cases where strong angular dependent forces differing appreciably in the two electronic states are present, data on trapped NH2 free radicals being presented as a case in point. The interaction of sodium atoms with argon at 4.2K is very complex, the data being consistent with multiple trapping sites for the atoms, a large repulsive interaction between the excited state of sodium and the rare gas, and apparent removal of the three-fold orbital degeneracy in the excited state by the environmental perturbation. (Author)

AD-624 213 Fld. 7/4, 20/3
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF
MEAN POLARIZABILITY OF EXCITED MOLECULAR HYDROGEN,
by W. C. Marlow. 8 Mar 65, 6p.
Unclassified report

Availability: Published in proceedings of the Physical Society V86 P731-5 1965. Copies to DDC users only.

Descriptors: (*Excitation, Hydrogen), (*Hydrogen, Molecules), (*Polarization, Hydrogen), Electrical properties, Dipole moments, Molecular energy levels, Ground state, Quantum mechanics, High-temperature research

The electric polarizabilities of the fourteen bound vibrational states of molecular hydrogen are calculated and found to range from 5.315 a cubed for the ground state to 10.065 a cubed for the thirteenth excited state. The radius of the first Bohr orbit is a. These values are subsequently used to compute the mean polarizability for temperatures ranging from 2000 to 5000K. The mean polarizability is found to vary over this temperature range from 5.350 a cubed to 5.630 a cubed. The results are discussed in connection with recent measurements of the polarizability of atomic hydrogen in which the vibrational states of the molecular hydrogen present in the experimental gas were highly excited. (Author)

AD-624 214 Fld. 7/4
CFSTI Prices: HC $3.00 MF $0.75
CARNEGIE INST OF TECH PITTSBURGH PA
A SHELL MODEL CALCULATION OF THE ODD TIN ISOTOPES.
Technical rept.,
by Michel Baranger, T. T. S. Kuo, and E. U. Baranger. Sep 65, 76p. Rept. no. tr-18
Contract Nonr-760 (15) Proj. NR-024 439
Unclassified report

Prepared in cooperation with Pittsburgh Univ., Pa.

Descriptors: (*Tin, Nuclear structure), (*Nuclear structure, Isotopes), (*Nuclear shell models, Tin), Nuclear magnetic moments, Nuclear energy levels, Quantum mechanics, Perturbation theory, Hamiltonian, Nucleons, Excitation, Nuclear spectroscopy

A shell-model Hamiltonian with a residual twonucleon interaction of Gaussian form is used to calculate the states of the odd tin isotopes. The BogoliubovValatin quasi-particle transformation is made and the residual interaction is diagonalized in a one- and threequasi-particle space. The spurious states must be projected out. Various approxima-

tions to this procedure, such as perturbation theory and a phonon approximation, are studied. Perturbation theory is adequate for low states. The phonon approximation is correct qualitatively, but not quantitatively. The parameters of the residual interaction and the single-particle energies are determined by requiring good agreement with the experimental energies. Magnetic moments, electromagnetic transition rates, and spectroscopic factors are calculated and agree well with the experimental values. (Author)

AD-623 709 See Fld. 11/10

AD-623 785 See Fld. 20/12

AD-623 859 See Fld. 21/2

AD-623 860 See Fld. 19/1

AD-623 870 See Fld. 7/3

AD-623 886 See Fld. 20/12

AD-623 932 See Fld. 4/1

AD-623 942 See Fld. 21/2

AD-623 971 See Fld. 20/9

AD-623 981 See Fld. 6/5

AD-623 983 See Fld. 6/5

AD-623 987 See Fld. 20/2

AD-624 006 See Fld. 7/3

AD-624 112 See Fld. 14/5

8. EARTH SCIENCES AND OCEANOGRAPHY

AD-624 066 Fld. 8
SCRIPPS INSTITUTION OF OCEANOGRAPHY UNIV OF CALIFORNIA LA JOLLA
A NEW PLANKTONIC SPECIES (FORAMINIFERIDA) FROM THE PLIOCENE OF PACIFIC DEEP-SEA CORES,
by Frances L. Parker. 16 Nov 65, 3p. Contract Nonr-2216 (23) Proj. NR-083-005
Unclassified report

Availability: Published in Contributions from the Cushman Foundation for Foraminiferal Research V16 PT4 P151-2 Oct 1965. Copies to DDC users only.

Descriptors: (*Plankton, Pacific Ocean), Marine biology, Stratigraphy

The new planktonic species Pulleniatina spectabilis (Foraminiferida) from the lower part of the Pliocene of Pacific deep-sea cores is described. This species appears to have a short range in the Pliocene and thus far has been found only in Pacific Ocean sediments. (Author)

8/1. BIOLOGICAL OCEANGRAPHY

AD-624 117 Fld. 8/1, 6/15, 7/3
RESEARCH TRIANGLE INST DURHAM N C NATURAL PRODUCTS LAB
PHOTOCHEMISTRY OF 2-ALKYL AMINO PHENOXAZ3-ONES,
by Samuel G. Levine, and M. C. Wani. 22 Apr 65, 6p. Contract DA-ARO (D)-31-124-G250 AROD 3418:1
Unclassified report

Availability: Published in Journal of Organic Chemistry V30 P3185-90 Sep 1965. Copies to DDC users only.

Descriptors: (*Antibiotics, Photochemistry), (*Amines, Photochemistry), (*N-heterocyclic compounds, Photochemistry), (*Ketones, Photochemistry), O-heterocyclic compounds, Azines, Pyrolysis, Quinones

A number of 2-monoalkylamino phenoxaz-3-ones were synthesized and their photochemistry was investigated. The methylamino- and ethylamino phenoxaz-3-one gave the corresponding oxazolophenoxazines on irradiation as well as thermolysis. Several alkylamino phenoxaz-3-ones, incapable of forming oxazolophenoxazines, gave novel oxazolinophenoxazines as the major products. A 2-aminophenoxaz-3-one resulting from the photochemical dealkylation of the above phenoxaz-3-ones was also isolated as a minor product. The results of the photochemical transformation were rationalized by plausible mechanisms. (Author)

AD-624 163 Fld. 8/1
CFSTI Prices: HC $1.00 MF $0.50
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF CHEMISTRY
PHYSICAL PROPERTIES OF ISOTOPICALLY SUBSTITUTED MOLECULES.
Final rept.,
by William A. Steele. Aug 65, 7p. Contract AF-AFOSR-118-63 Proj. AF-9760 Task 976003 AFOSR 65-1693
Unclassified report

See also AD-604-468.

Descriptors: (*Deuterated compounds, Physical properties), (*Methane, Deuterated compounds), (*Balances, Design), Density, Molecules, Vapor pressure, Fluids, Liquids, Purification, Temperature

The research accomplishments of this study include: (1) completion of a balance for accurately measuring fluid density over wide ranges of temperature and pressure (2) construction of a low temperature still for purifying materials whose densities were measured; and (3) measurement of the density of methane and perdeuteromethane at temperatures from the melting point to the critical region, and at pressures up to 80 atm. The balance attained an accuracy of 1-2 parts in 10,000 in density and of = 0.1 psi pressure and = 0.01C temperature. (Author)

AD-623 972 See Fld. 7/4

AD-624 169 See Fld. 7/3

8/2. CARTOGRAPHY

AD-623 956 Fld. 8/2, 14/5
CFSTI Prices: HC $3.00 MF $0.75
AERONAUTICAL CHART AND INFORMATION CENTER ST LOUIS MO PHOTOGRAMMETRY DIV
USE OF THE AUTOFOCUS RECTIFIER.
Technical rept.,
by George J. Bandemer. Jun 54, 83p. ACIC TR-39
Unclassified report

Descriptors: (*Photogrammetry, Rectifiers (Photography)), (*Rectifiers (Photography), Instruction manuals), Operation, Design, Photographic printers

Contents: Description and capabilities of the autofocus rectifier, principles of mechanical design, operation, computational techniques, photographic printing techniques.

8/3. DYNAMIC OCEANOGRAPHY

AD-623 811 Fld. 8/3
CFSTI Prices: HC $1.00 MF $0.50
NAVAL OCEANOGRAPHIC OFFICE WASHINGTON D C
STATIONARY WIND-DRIVEN CURRENTS IN THE NONHOMOGENEOUS OCEAN OF VARIABLE DEPTH,
by L. M. Fomin. 1965, 24p. Rept. no. trans-257 TT 65-64560
Unclassified report

Statsionarnye Vetrovye Techeniya v Neodnorodnom Okeane Peremennoi Glubiny, trans. of Akademiya Nauk SSSR. Institut Okeanologii. Trudy, v66 p29-45 1963.

Descriptors: (*Ocean currents, Wind), (*Wind, Ocean currents), Marine meteorology, Hydrodynamics, Marine geophysics, USSR

The theoretical basis of a computation method for steady wind-driven current velocities (the deep ocean with complex bottom topography) is discussed in this paper. The value of the water transport depends on the vorticity of shearing stress of the wind and on the bottom slope. Ways of transition from water transport to the current velocities in the individual layers are considered (a) when the water density distribution is known and (b) when the water mass structure corresponds to the given model. (Author)

AD-624 239 Fld. 8/3
CFSTI Prices: HC $5.00 MF $1.00
TEXAS A AND M UNIV COLLEGE STATION DEPT OF OCEANOGRAPHY AND METEOROLOGY
ON STEADY, WIND-DRIVEN OCEAN CURRENTS IN A STRATIFIED MODEL OF TWO MOVING LAYERS,
by Worth D. Nowlin,Jr.. Nov 65, 186p. Rept. no. reference-65-32T
Contract Nonr2119 (04) Proj. A and M-286-1
Unclassified report

Descriptors: (*Ocean currents, Wind), (*Wind, Ocean currents), Hydrodynamics, Oceans, Mathematical models, Marine meteorology, Marine geophysics

The results of an analysis of steady, wind-driven currents in a (stably stratified) two-layer ocean are presented. This system is characterized by two moving layers. It is confined within a rectangular basin on a beta-plane, which is a mathematical abstration representing low and middle latitude regions of the earth. Two distinct mathematical problems are considered. The first deals with a steady frictional model of the entire basin. The second problem concerns inertial currents formed in the lower latitudes of the western boundary region. This inertial current system provides an alternative to the frictional current system as the solution in the lower boundary region. The two-layer frictional model with stable density stratification is admittedly a rough approximation to the real ocean, in which density varies continuously with elevation. The purpose in pursuing the analysis for a discontinuously stratified model (finite difference approximation) is to obtain an approximation to the vertical, as well as the horizontal, variations in the mean horizontal velocity field.

AD-623 959 See Fld. 13/10

8/4. GEOCHEMISTRY

AD-623 929 Fld. 8/4, 14/5, 20/5, 17/8
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS TERRESTRIAL SCIENCES LAB
PHOTOGRAPHING SATELLITE-REFLECTED LASER PULSES FOR GEODETIC STEREO TRIANGULATION,
by Robert L. Iliff. 6 Apr 65, 12p. Rept. no. instrumentation Papers-83
Proj. AF-7600 Task 7600-06
AFCRL 65-74
Unclassified report

Availability: Published in Journal of Geophysical Research V70 N14 P3505-8. Copies to DDC users only.

Descriptors: (*Lasers, Photographic lighting systems), (*Photographic lighting systems, Lasers), (*Astronomical geodesics, Satellite tracking systems), (*Satellite tracking systems, Photographic techniques), Satellites (Artificial), Reflectors, Light pulses, Reflection, Stereoscopic range finding, Geodesics

A ruby laser has been used as a ground based light source to illuminate a specially equipped satellite, Explorer 22, with sufficient energy to photograph the cube corner reflectors on the satellite. The liquid nitrogen cooled laser is used in the long pulse mode and has an output of 250 joules at 17 kilojoules input. The camera used in the experiment has a focal length of 1016 mm and a 203 mm aperture with a 10 by 10 degree field format. It was estimated that approximately 1.8 x 10,000 photons made up the image. (Author)

AD-624 176 Fld. 8/4
LAMONT GEOLOGICAL OBSERVATORY PALISADES N Y
ON THE M SUB I-COMPONENT OBTAINED BY GRAVIMETRIC TIDAL OBSERVATION (SCREENING OF GRAVITATIONAL FORCES),
by Ichiro Nakagawa. 3 Sep 64, 11p. Contract AF-AFOSR-62-303 Proj. VELA-UNIFORM

Unclassified report

Presented at the International Symposium on Earth Tides (5th), Brussels, Belgium, Jun 64.

Availability: Published in Special Contributions, Geophysical Institute, Kyto University N4 P9-17 1964. Copies to DDC users only.

Descriptors: (*Gravity, Geodesics), (*Geodesics, Gravity), Solar eclipses, Lunar environment, Geophysics

Absorption of gravitational forces has mainly been investigated during periods of solar eclipse by several investigators, and it has been established that the absorption effect of gravitation, if it exists, does not exceed the noise level. The mass of the earth is larger than that of the moon and therefore the gravitational absorption due to the earth's mass itself should be larger than that due to the moon's mass. In the present paper, a trial to detect the absorption effect of the lunar gravitational forces by the earth's mass is described by using data obtained with an Askania gravimeter No. 111, installed at Kyoto, during a period of one year. By the present investigation, it is ascertained that the gravitational absorption due to the earth's mass is about 4 microgal and that its value reaches a maximum two hours after the instant when the moon transited the meridian of the observation station. The value of amplitude obtained by observation is in good agreement with that predicted by theoretical calculation. But concerning the phase, there exists a difference of about 180 degrees compared with that expected by theoretical calculation. (Author)

8/5. GEODESY

AD-623 734 Fld. 8/5, 8/7
WOODS HOLE OCEANOGRAPHIC INSTITUTION MASS
ORGANIC PIGMENTS: THEIR LONG-TERM FATE.
Technical rept.,
by Max Blumer. Oct 65, 8p. Rept. no. ref-65-54
Contract Nonr-2196 (00) Grant ,NSF-GP-3250

Unclassified report

Availability: Published in science V149 N3685 P722-6 Aug 13 1965. Copies to DDC users only.

Descriptors: (*Organic pigments Paleontology), (*Geochemistry, Organic pigments), (*Paleontology, Organic pigments), Organic materials, Geologic age determination, Phase studies, Geology

Fossil pigments are studied to provide evidence of modification of chemical structure under geological conditions. (Author)

8/6. GEOGRAPHY

AD-624 092 Fld. 8/6, 8/7, 4/2
AERONAUTICAL CHART AND INFORMATION CENTER ST LOUIS MO LINGUISTIC SECTION
SOVIET EXPEDITIONS TO THE ANTARCTIC 1958-1960,
by A. V. Nudelman. Oct 65, 41p. Rept. no. TC-948
TT 65-64589

Unclassified report

Trans. of mono. Sovetskie Expeditsii v Antartiku 1958-1960, Moscow, 1960 p5-8, 32-55, 75-82.

Availability: Reference only at DDC Hq after original copies exhausted. Not for sale.

Descriptors: (*Antarctic regions, Exploration), (*Geophysics, Antarctic regions), USSR, Scientific organizations, Scientific personnel, Geological survey, Meteorology, Instrumentation, Transportation, Geography, Scientific research

8/7. GEOLOGY AND MINERALOGY

AD-623 759 Fld. 8/7, 20/12
MIDWEST APPLIED SCIENCE CORP LAFAYETTE IND
TWO METHODS FOR ESTIMATING COMPRESSION AND SOUND VELOCITY AT VERY HIGH PRESSURES.
by Orson L. Anderson. 19 Jul 65, 9p. Rept. no. lgo-838
Contract AF49 (638)-1355

Unclassified report

Availability: Published in Proceedings of the National Academy of Sciences V54 N3 P667-73 Sep 1965. Copies to DDC users only.

Descriptors: (*Sound, Velocity), (*Compressive properties, Mathematical analysis), High-pressure research, Shock waves, Acoustic properties, Equations of state, Sound transmission, Rock (Geology)

Precision sound velocity measurements made at relatively low pressure (less than 10 kilobars) can be used to estimate sound velocity and volume compression at very high pressures. If the parameters of a continuous analytic function are sufficiently accurately determined at low values of the independent variable, the function may be evaluated at high values of the independent variable. Consequently, only materials undergoing compression without phase change are treated. What is new is the presentation of two functions suitable for representing volume dependence upon pressure (compression curves) and the evaluation of the parameters in these functions from acoustic data taken at low pressures but with high precision. The parameters are the bulk modulus and its higher derivatives. (Author)

AD-623 933 Fld. 8/7, 14/2
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS TERRESTRIAL SCIENCES LAB
PRESSURE GRADIENTS IN BRIDGMAN ANVIL DEVICES.
Interim scientific rept.,
by L. C. Towle, and R. E. Riecker. Sep 65, 38p. Rept. no. instrumentation papers-81
Contract arpa order-292 Proj. AF-7639 ,Vela Uniform Task 763905
AFCRL 65-70

Unclassified report

Prepared in cooperation with Allis-Chalmers Mfg. Co., Milwaukee, Wis., Contract AF19 (628)-1646.

Descriptors: (*High-pressure research, Geophysics), (*Geophysics, High-pressure research), (*Shear stresses, Geophysics), Rock (Geology), Minerals, Compressive properties, Load distribution, Phase studies, Instrumentation, Seismology

Experimental evidence regarding pressure gradients in Bridgman anvil devices is reviewed and some new experimental data are presented. Although there are many differences in details, all the experimental evidence is found to fit a general pattern. A simple empirical relationship describing the pressure distribution is derived which is consistent with experimental observation. The experimentally determined pressure is used to estimate errors introduced into various types of anvil experiments by pressure gradients. Numerical values for the correction factors are given in graphical form for a wide range of experimental conditions. Analysis of shear experiments indicates that pressure gradients are much smaller under dynamic conditions. Analysis also shows that the peripheral sample region which is partially nonload-supporting frequently has a greater detrimental effect on anvil experiments than does the pressure gradient which exists over the central portion of the sample cell. (Author)

AD-623 734 See Fld. 8/5

AD-624 092 See Fld. 8/6

AD-624 122 See Fld. 8/8

AD-624 173 See Fld. 8/11

8/8. HYDROLOGY AND LIMNOLOGY

AD-624 122 Fld. 8/8, 13/2, 8/7
CFSTI Prices: HC $3.00 MF $1.00
BUREAU OF RECLAMATION DENVER COLO
THE 1964 SEDIMENTATION SURVEY OF BOYSEN RESERVOIR, WYOMING.
Nov 65, 78p.

Unclassified report

Descriptors: (*Sedimentation, Dams), (*Dams, Sedimentation), (*Hydrology, Wyoming), Geology, Civil engineering, Hydrographic surveying, Rivers, Lakes

The usefulness of a reservoir is directly affected by the accumulation of sediment within the reservoir space. Appraisal of the extent of depletion is necessary to successful reservoir operation. The purpose of this report is to evaluate the sediment accumulation which has occurred in Boysen Reservoir since closure of Boysen Dam. This report presents the data analyses and summary of the following aspects of Boysen Reservoir sedimentation: (a) Field investigations, (b) analytical methods, (c) reservoir storage depletion, (d) quantitative sediment yield from the drainage area, (e) trap efficiency, (f) physical characteristics of the sediment accumulation, (g) distribution and disposition of the sediment accumulation, and (h) channel degradation below Boysen Dam.

AD-624 236 Fld. 8/8, 12/1
COURANT INST OF MATHEMATICAL SCIENCES NEW YORK UNIV N Y
NUMERICAL SOLUTION OF FLOOD PREDICTION AND RIVER REGULATION PROBLEMS. REPORT I. DERIVATION OF BASIC THEORY AND FORMULATION OF NUMERICAL METHODS OF ATTACK,

by J. J. Stoker. Oct 53, 38p. Rept. no. IMM-NYU-200
Contract DA-33-017-eng-223
Unclassified report

Availability: Reference only at DDC Hq after original copies exhausted. Not for sale.

Descriptors: (*Floods, Mathematical prediction), (*Numerical analysis, Hydrology), (*Hydrology, Numerical analysis), Rivers, Water waves, Control, Equations of motion

AD-624 237 Fld. 8/8, 12/1
CFSTI Prices: HC $2.00 MF $0.50
COURANT INST OF MATHEMATICAL SCIENCES NEW YORK UNIV N Y
NUMERICAL SOLUTION OF FLOOD PREDICTION AND RIVER REGULATION PROBLEMS. REPORT II. NUMERICAL SOLUTION OF FLOOD PROBLEMS IN SIMPLIFIED MODELS OF THE OHIO RIVER AND THE JUNCTION OF THE OHIO AND MISSISSIPPI RIVERS, CONCLUSIONS VALUABLE FOR THE ACTUAL CASES,
by E. Isaacson, J. J. Stoker, and A. Troesch. Jan 54, 50p. Rept. no. imm-NYU-205
Contract DA-33-017-eng-223
Unclassified report

Descriptors: (*Floods, Mathematical prediction), (*Numerical analysis, Hydrology), (*Hydrology, Models (Simulation)), Rivers, Ohio, Mississippi, Water waves, Control, Equations of motion

AD-624 238 Fld. 8/8, 12/1
CFSTI Prices: HC $4.00 MF $0.75
COURANT INST OF MATHEMATICAL SCIENCES NEW YORK UNIV N Y
NUMERICAL SOLUTION OF FLOOD PREDICTION AND RIVER REGULATION PROBLEMS. REPORT III. RESULTS OF THE NUMERICAL PREDICTION OF THE 1945 AND 1948 FLOODS IN THE OHIO RIVER, OF THE 1947 FLOOD THROUGH THE JUNCTION OF THE OHIO AND MISSISSIPPI RIVERS, AND OF THE FLOODS OF 1950 AND 1948 THROUGH KENTUCKY RESERVOIR,
by E. Isaacson, J. J. Stoker, and A. Troesch. Oct 56, 115p. Rept. no. imm-NYU-235
Contract DA-33-017-eng-267
Unclassified report

Descriptors: (*Floods, Mathematical prediction), (*Numerical analysis, Hydrology), (*Hydrology, Numerical analysis), (*Mathematical prediction, Feasibility studies), Rivers, Ohio, Mississippi, Dams, Kentucky, Water waves, Control, Equations of motion

AD-623 950 **See Fld. 8/10**

8/10. PHYSICAL OCEANOGRAPHY

AD-623 733 Fld. 8/10
WOODS HOLE OCEANOGRAPHIC INSTITUTION MASS
MORPHOLOGY AND SEDIMENTS OF A PORTION OF THE MID-ATLANTIC RIDGE.
Technical rept.,
by Tjeerd H. van Andel. Oct 65, 8p. Rept. no. ref-65-53
Contract Nonr-2196 (00) ,AT (30-1)-2174
Unclassified report

Prepared in cooperation with NSF, Grants NSF-GP-921, NSF-GP-1599.

Availability: Published in science V148 N3674 P1214-6 May 28 1965. Copies to DDC users only.

Descriptors: (*Marine geology, Atlantic Ocean), (*Atlantic Ocean, Ocean bottom topography), (*Ocean bottom topography, Atlantic Ocean), Sedimentation, Ocean bottom sampling, Marine geophysics, Hydrographic surveying

In October 1964, a detailed geophysical and sampling survey was made of the central part of the Mid-Atlantic Ridge between 22 and 23 degrees north latitude. The results indicate a large difference in age between the relief of the crest and that of the flanks of the Ridge and suggest that the crest portion is very young. Detailed surveys of two sediment-filled valleys on the upper western flank of the Ridge reveal different sedimentary sequences in the two valleys and indicate the probable existence of a locally controlled depositional regime and a significant local supply of sediment. (Author)

AD-623 949 Fld. 8/10
CFSTI Prices: HC $1.00 MF $0.50
OREGON STATE UNIV CORVALLIS DEPT OF OCEANOGRAPHY
SURFACE TEMPERATURE AND SALINITY OBSERVATIONS AT PACIFIC NORTHWEST SHORE STATIONS FOR 1963 AND 1964,
by Bruce Wyatt, Robert Still, and Cary Haag.
Oct 65, 19p. Rept. no. data-21 Ref-65-20
Contract Nonr1286 (10) Proj. NR-083-102
Unclassified report

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Pacific Ocean, Oceanology), (*Surface temperatures, Pacific Ocean), (*Salinity, Pacific Ocean), Seacoast, Oceanographic data, Sampling, Washington (State), Oregon, California

During 1963 and 1964 the Department of Oceanography, Oregon State University, continued its program of shore sampling of ocean temperatures and salinities along the coast of the Pacific Northwest. The data in the report were collected at twelve stations in 1963 and at five stations in 1964. The original goals of the shore sampling program were to obtain basic information about the distributions of temperature and salinity along the coast and to aid in monitoring offshore conditions. Detailed analyses of the early data showed that we can classify Oregon coastal waters into several types according to the major processes that affect them (Pattullo and Denner, 1965). These results led us to modify the sampling program to provide us with more detailed data. Therefore, in 1964 data were taken daily, rather than weekly, at five of the original twelve stations. The five stations were selected so that each of the several water types would be sampled regularly. Sampling sites were located at points exposed to the open ocean where the influence of fresh water runoff was minimal. Whenever possible, observations were made at the time of high tide.

AD-623 950 Fld. 8/10, 8/8
OREGON STATE UNIV CORVALLIS DEPT OF OCEANOGRAPHY
COMPILATION OF REPRINTS.
Technical repts.,
by Wayne V. Burt, Robert K. Lane, Paul M. Maughan, and June Pattullo. Oct 65, 42p. Rept. no. tr-49, Ref-64-34
Contract Nonr-1286 (10) Grant ,NSF-GP-3548
Proj. NR-083-102
Unclassified report

Availability: Published in various journals. Copies to DDC users only.

Descriptors: (*Oceanology, Reports), (*Evaporation, Mathematical prediction), Ocean currents, Seacoast, Oregon, Hydrology, Phase studies, Oceanographid data

Contents: Drift bottle observations of the Davidson current off Oregon, by Wayne V. Burt and Bruce Wyatt; Estimating evaporation from insolation, by Robert K. Lane; A solar and long-wave radiation measuring system for shipboard use, by Paul M. Maughan and Roderick S. Mesecar; Processes affecting seawater characteristics along the Oregon coast, by June Pattullo and Warren Denner.

AD-624 240 Fld. 8/10
CFSTI Prices: HC $2.00 MF $0.50
APPLIED OCEANOGRAPHY GROUP UNIV OF CALIFORNIA SAN DIEGO
MICROLAYER COLLECTION FROM THE SEA SURFACE: A NEW METHOD AND INITIAL RESULTS,
by George W. Harvey. 1 Nov 65, 31p. Rept. no. AOG-U-621
Contract Nonr-2216 (13)
Unclassified report

Descriptors: (*Sea water, Samplers), (*Samplers, Collecting methods), Surfaces, Oceanographic equipment, Sampling, Films, Microanalysis, Contamination, Marine biology, Chlorophylls, Surface tension

A new surface collector makes possible the rapid collection of large volumes of relatively undisturbed water and surface film from the upper 60 microns of the sea surface. An area of over 1,000 square meters can be sampled in an hour. The characteristics of this previously poorly known region can now be investigated. Preliminary results are reported. (Author)

8/11. SEISMOLOGY

AD-623 780 Fld. 8/11
CFSTI Prices: HC $1.00 MF $0.50
GEOLOGICAL SURVEY DENVER COLO
HIGH-FREQUENCY CONTENT OF SPECIAL RECORDINGS.
Technical letter,
by John H. Healy, and Wayne H. Jackson. 15 Nov 65, 13p. Rept. no. crustal Studies-40
Contract arpa order-193-65 Proj. LONGSHOT
Unclassified report

Descriptors: (*Seismology, Recording systems), High frequency, Seismic waves, Frequency analyzers, Seismographs

The high-frequency content of teleseismic signals are investigated by means of a combination of EV-17 (1 cps) geophones and filter settings used to get the highfrequency portion of the signal on magnetic tape with sufficient dynamic range for analysis.

AD-623 875 Fld. 8/11
CFSTI Prices: HC $2.00 MF $0.50
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH
PHYSICS OF THE SEISMIC SOURCE,
by E. Orowan. Sep 65, 49p. Rept. no. d1-82-0471
Unclassified report

Also available from the author.

Descriptors: (*Seismology, Faults (Geology)), (*Faults (Geology), Seismology), Epicenter, Earthquakes, Lithosphere, Shear stresses, Seismic waves, Geophysics, Fracture (Mechanics)

The 'fault source' and the 'double-couple source' are discussed as possible mechanisms of seismic shock generation.

AD-624 001 Fld. 8/11
CFSTI Prices: HC $1.00 MF $0.50
GEOLOGICAL SURVEY DENVER COLO
STUDY OF SEISMIC PROPAGATION PATHS AND REGIONAL TRAVELTIMES IN THE CONTINENTAL UNITED STATES.
Progress rept. for period ending 31 Oct 65,
by D. J. Stuart. 31 Oct 65, 3p. Contract arpa order-193-64
Unclassified report

Descriptors: (*Seismology, Explosion effects), Seismic waves, Propagation, Velocity, Seismological stations, United States

The Geological Survey recorded seismic waves generated by LONGSHOT at five stations on the Alaskan mainland, two stations on the Aleutian chain, five stations in Colorado, one station in Nevada, and one station in California, in addition to locations where we have a permanent-station recording capability. Distances ranged from 440 km at Attu to 5987 km at Trinidad, Colorado. Good quality seismograms were recorded at all stations. Reduced traveltimes of first arrivals are shown with a comparison with the standard Jeffrey-Bullen curve. The time scale has been reduced by a velocity factor of 8.1 km/sec. (Author)

AD-624 016 Fld. 8/11, 18/3
CFSTI Prices: HC $2.00 MF $0.50
JASON DIV INST FOR DEFENSE ANALYSES ARLINGTON VA
SEISMIC SIGNALS FROM NUCLEAR EXPLOSIONS IN OVERDRIVEN CAVITIES.
Research paper,
by H. W. Lewis, and S. B. Treiman. 28 Jun 65, 26p. Rept. no. rp-P-193
Contract SD-50
Unclassified report

Descriptors: (*Seismology, Nuclear explosions), (*Nuclear explosions, Seismology), Underground explosions, Explosion effects, Seismic waves, Damping, Underground structures

A static treatment is given of the seismic signal from nuclear explosions in overdriven cavities, with particular attention to the role of incipient tension. When the elastic limits are exceeded, the seismic signal is larger than a purely elastic treatment would imply. This enhancement, however, grows relatively slowly with overdrive under certain circumstances. (Author)

AD-624 173 Fld. 8/11, 8/7
OBSERVATORIO CENTRAL GEOFISICO TOLEDO (SPAIN)
IBERIAN PENINSULA CRUSTAL STRUCTURE FROM SURFACE WAVES DISPERSION,
by B. G. Payo. 22 Mar 65, 19p. Contract AF61 (052)-657 Proj. VELA-Uniform
Unclassified report

Availability: Published in Bulletin of the Seismological Society of America V55 N4 P727-43 Aug 1965. Copies to DDC users only.

Descriptors: (*Seismology, Spain), (*Structural geology, Spain), Earthquakes, Seismic waves, Propagation, Mediterranean Sea, Seismological stations, Portugal

Phase velocity of Rayleigh waves traveling from Toledo to Malaga have been determined from seven selected earthquakes. The direction of approach of the wave front in relation to the ground particle motion at the standard Spanish stations (Toledo and Malaga) and at Porto (Portugal) is discussed. Also these three Observatories are considered as a triangular array to determine the phase velocity through the Iberian Peninsula region; this result is compared with the dispersion data determined by the two stations at Toledo and Malaga. Two similar crustal-mantle structures, named IB1 and IB2, have been obtained for this Region, by modifying the models Dorman 8021 and CANSD respectively, and by means of the partial derivatives of the phase velocity with respect to the parameters of the layers. Both models IB1 and IB2 are almost identical and their corresponding dispersion curves fit the data with an error less than 0.1 km/sec. The crustal thickness given by these structures is about 33 km. Group velocities of Love and Rayleigh waves from near earthquakes have been also studied. Some Algerian earthquakes yielded a dispersion curve for the arm of the Mediterranean Sea between Algeria and Spain. The curve appears almost typically oceanic. (Author)

AD-623 820 **See Fld. 18/3**

AD-624 121 **See Fld. 5/1**

8/12. SNOW, ICE, AND PERMAFROST

AD-623 754 Fld. 8/12
WASHINGTON UNIV SEATTLE DEPT OF ATMOSPHERIC SCIENCES
THE ROUGHNESS PARAMETERS OF SEA ICE.
Technical rept., revised,
by N. Untersteiner, and F. I. Badgley. 4 Jun 65, 6p. Rept. no. tr-19
Contract Nonr-477 (24) Proj. NR-307-252
Unclassified report

Revision of manuscript submitted 10 May 65.

Availability: Published in Journal of Geophysical Research V70 N18 P4573-7 Sep 15 1965.

Descriptors: (*Ice islands, Fluid dynamic properties), Sea water, Ice, Roughness, Surface area

The influence of the roughness length on calculated fluxes of momentum and matter in the boundary layer is discussed. From observations of the velocity profiles of wind and water current, the roughness length of arctic sea ice is found to vary greatly around an average of 0.02 cm for the upper and 2 cm for the lower surface. (Author)

AD-623 881 Fld. 8/12, 13/2, 13/13
CFSTI Prices: HC $1.00 MF $0.50
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
SEA ICE STUDIES ON MCMURDO SOUND DURING DEEP FREEZE 65.
Technical note. Oct 64-Jun 65,
by Russell A. Paige, and Claude W. Lee. Oct 65, 24p. Rept. no. tn-721
Proj. Y-F015-11-01-026
Unclassified report

Descriptors: (*Civil engineering, Ice islands), (*Ice islands, Trafficability), Antarctic regions, Sea water, Ice, Physical properties, Safety

The sea ice adjacent to McMurdo Station, Antarctica, has been used extensively since 1956 for aircraft operations, travel, freight hauling, and loading and unloading ships. A study of some factors affecting the safety and efficiency of these operations was made during the summer of 1964-65. The factors included cracks, seal holes, pressure ridges, and breakout of the ice in this area at the end of the 1964-65 summer season. It was found that cracks which did not penetrate the ice sheet, and seal holes in thick ice did not seriously affect the bearing capacity of the ice; however, flooding in pressure zones and around seal holes on the ice sheet created a hazard to travel where the ice was covered with snow. In addition, it was observed that breakout of the ice south of McMurdo Station began about 3 weeks after the ice exhibited minimum strength, maximum temperature, and a rapid decrease in thickness, and 4 to 6 weeks after maximum daily air temperatures were observed at McMurdo Station. It was concluded that additional research is needed to provide adequate knowledge on the influence of those factors affecting the safe and efficient utilization of sea ice in Antarctica.

AD-623 994 Fld. 8/12
CFSTI Prices: HC $2.00 MF $0.50
MCGILL UNIV MONTREAL (QUEBEC) STORMY WEATHER GROUP
EXPERIMENTS ON THE NUCLEATION OF ICE 1961-63,
by E. J. Stansbury, and Gabor Vali. Aug 65, 27p.
Rept. no. scientific-7 ,MW-46
Contract AF19 (628)-249 Proj. AF-8620 Task 862004
AFCRL 65-69
Unclassified report

Descriptors: (*Nucleation, Ice), (*Ice, Nucleation), Freezing, Supercooling, Hail, Snow, Water, Phase studies

Results of recent nucleation experiments with raindropsized samples of distilled water, snow and hail were reported in MW-41 (Vali and Stansbury 1965). In the years 1961-63 similar experiments with less sophisticated equipment produced data on more than 20,000 freezing events. The work of MW-41 indicated that the dependence of freezing temperatures on cooling rate in the earlier experiments was small. The data has therefore been re-examined. For distilled water, the frequency distribution of freezing events with temperature has the shape predicted by the stochastic hypothesis. The mean freezing temperature of drops of distilled water increases by 1 degree when the volume is doubled. The behaviour of distilled water during and just following an interval at constant temperature is not predicted correctly by the stochastic hypothesis. For drops of natural precipitation the distributions cannot be described simply in analytical form: water from Alberta hail shows the warmest freezing temperatures, precipitation from Montreal freezes at somewhat colder temperatures. For drops formed from hail, the experiments suggest that the temperature of freezing is related to the specific nucleus content of the drops, and cannot be explained on a stochastic basis alone. (Author)

AD-624 198 Fld. 8/12
CFSTI Prices: HC $1.00 MF $0.50
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
A THEORY OF SNOW FAILURE.
Research rept.,
by G. E. H. Ballard, and R. W. McGaw. Aug 65, 15p. Rept. no. RR-137
Proj. DA-1V014501B52A31
Unclassified report

Descriptors: (*Snow, Mechanical properties), Ice, Porous materials, Stresses, Failure (Mechanics), Theory

A failure theory for dry snow is based on the supposition that the nature of ice at the temperatures found in natural snow will cause stress concentration at a pore boundary to be minimized. External stresses will therefore tend to be uniformly distributed across constricted areas of solid substance. Failure is considered to occur when the available solid substance is stressed to its ultimate strength, taking into consideration the function of temperature and type of failure, i.e., tension, compression, or shear.

AD-624 199 Fld. 8/12
CFSTI Prices: HC $2.00 MF $0.50
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
STUDIES OF ICE ETCHING. I. APPLICATION OF THERMAL ETCHING TO THE STUDY OF SURFACE ABRASION IN ICE CRYSTALS.
Research rept.,
by Daisuke Kuroiwa. May 65, 32p. Rept. no. rr-142
Task DA-IV014501B52A31
Unclassified report

Prepared in cooperation with the Institute of Low Temperature Science, Hokkaido Univ., Sapporo (Japan).

Descriptors: (*Ice, Surface properties), (*Etched crystals, Ice), Abrasives, Heat, Crystallography, Snow, Friction

Thermal etching of ice and its application to the investigation of surface abrasion in ice crystals is explained. Investigations of surface abrasion

in ice crystals provide fundamental information in the study of snow and ice friction. The technique of producing evaporation etch pits by the application of Formvar film to the ice crystal surface is described, and the development of microcrystals by recrystallization is compared with the surrounding mother crystals. Experimental data are presented and discussed with emphasis on the development of thermal etch pits, scratches on different crystal faces, damage to the prismatic face, thermal etch channels on the basal plane, predominant orientation of etch channels on the basal plane, and etch-pit-free zones and stress concentrations around solid inclusions. (Author)

8/13. SOIL MECHANICS

AD-624 004 See Fld. 2/4

8/14. TERRESTRIAL MAGNETISM

AD-623 928 Fld. 8/14, 4/1
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS SPACE PHYSICS LAB
A STUDY OF VERTICAL CUTOFF RIGIDITIES USING SIXTH DEGREE SIMULATIONS OF THE GEOMAGNETIC FIELD.
Environmental research papers, revised ed.,
by M. A. Shea, and D. F. Smart. 21 May 65, 24p.
Rept. no. erp-143
Proj. AF-8600 Task 8600-04
AFCRL 65-73

Unclassified report

Revision of manuscript submitted 26 Feb 65.

Availability: Published in Journal of Geophysical Research V70 N17 P4117-30 Sep 1 1965. Copies to DDC users only.

Descriptors: (*Terrestrial magnetism, Cosmic rays), (*Cosmic rays, Terrestrial magnetism), Particle trajectories, Atmosphere, Angle of arrival, Geophysics, Simulation

Using sixth degree simulations of the quiescent geomagnetic field, the vertical cutoff rigidities of more than three hundred positions on the earth's surface are studied. Twenty-six of these positions are near the South African magnetic anomaly, and six other points are in a region of the North Atlantic where Pomerantz and Agarwal have reported anomalous results. The cutoff rigidities have been obtained by detailed computation of the trajectories of cosmic rays at 0.01-bv rigidity intervals to allow for the effects of the penumbra. Differences greater than 15% from the Quenby and Wenk threshold values have been found in the vicinity of South Africa, the South Atlantic, and the Canary Islands. Various latitude surveys are shown to exhibit consistency when plotted against the cutoff rigidities determined by this computational method. It is concluded that, though there is essentially no difference between the cutoff rigidities obtained using two currently accepted field models, these simulations of the geomagnetic field are not completely adequate over some parts of the earth to describe the cosmic-ray effects in their entirety. Cutoff rigidities for a number of neutron monitors are listed. (Author)

AD-623 993 Fld. 8/14, 4/1
CFSTI Prices: HC $1.00 MF $0.50
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF
FURTHER INVESTIGATIONS OF STORM-TIME SUB ELF EMISSIONS.
Technical rept.,
by Lee Tepley, R. C. Wentworth, and K. D. Amundsen. 25 Jul 64, 24p. Rept. no. lmsc-4-28-64-1

Contract Nonr-4454 (00) Proj. RR-004-01-01,RR-008-01-01

Unclassified report

Descriptors: (*Magnetic storms, Atmospherics), (*Atmospherics, Superlow frequency), Electromagnetic waves, Terrestrial magnetism, Magnetic recording systems, Frequency analyzers, Wave functions, Geophysics

This report is concerned with the following properties of certain types of sub ELF emissions (delta f = 0.2-5 cps) observed during magnetic storms: (1) The aural characteristics of the emissions obtained from time-compressed magnetic tape; (2) the frequency-time (f-t) characteristics of the emissions as displayed on sonagrams; (3) the degree of simultaniety of emissions observed simultaneously at widely separated locations (the four Lockheed Pacific Ocean Stations); and (4) the relationships between the occurrence times of the emissions and the following quantities: (a) Magnetic Kp index, (b) local time of day, and (c) local sunset. Perhaps the most interesting result of the investigation is the observation that storm-time sub ELF emissions seem to excite natural resonances in the exosphere. This effect is explained in terms of an existing theoretical model. Also of interest is the observation that the signals are most frequently observed near 800 PM local time. The occurrence time seems to indicate that the signal source is asymmetric with respect to the sun-earth line. (Author)

AD-624 088 Fld. 8/14, 22/2
CFSTI Prices: HC $2.00 MF $0.50
FAIRCHILD HILLER CORP FARMINGDALE N Y REPUBLIC AVIATION DIV
DESIGN OF THE PAYLOAD AND EXPERIMENT TO MEASURE THE VECTOR COMPONENTS OF THE EARTH'S MAGNETIC FIELD FROM A JAVELIN ROCKET.
Final rept. 1 Dec 64-31 Aug 65,
by P. G. Forsyth. 30 Sep 65, 26p. Rept. no. fhr-2240-2
Contract AF19 (628)-2372 Proj. AF-7601 Task 760103
AFCRL 65-80

Unclassified report

See also AD-460 790.

Descriptors: (*Terrestrial magnetism, Measurement), (*Sounding rockets, Feasibility studies), Payload, Magnetometers, Nose cones, Ground support equipment, Design

This report summarizes the results of feasibility tests to measure the earth's vector magnetic field from a Javelin rocket, and describes briefly the missile and ground electronic systems that have been designed to make the measurement. The program is directed to: Determining the attitude of a Javelin rocket nose cone by means of an electromagnetic attitude sensor using antenna-array signalstrength patterns. Making vector component magnetic measurements within the rocket nose cone by means of switched bias coils and a caesium vapor magnetometer. Encoding and telemetering the resulting information in a format compatible with the existing facilities. Developing computational techniques for reducing the data obtained from the above system. (Author)

AD-623 948 See Fld. 4/1

9/1. COMPONENTS

AD-623 703 Fld. 9/1
CFSTI Prices: HC $2.00 MF $0.50
GEORGIA INST OF TECH ATLANTA ENGINEERING EXPERIMENT STATION
QUARTZ CRYSTAL AGING EFFECTS.
Semiannual rept. no. 9, 15 Feb-15 Aug 65,
by R. B. Belser, and W. H. Hicklin. Sep 65, 46p.
Rept. no. a-680-9
Contract DA-36-039-AMC-02251 (E) Proj. DA-1P6-22001-A-05801 ECOM 02251 (E)-

Unclassified report

See also AD-604 269.

Descriptors: (*Quartz resonators, Aging (Materials)), (*Aging (Materials), Quartz resonators), (*Radiation damage, Quartz resonators), Reliability (Electronics), Quartz, High frequency, Frequency shift, X-ray diffraction analysis, Failure (Electronics), Low frequency, Medium frequency, Surface properties, Processing, Ultrasonic welding, Strain (Mechanics)

Aging studies of 3 Mc units were made. Aging rates for cultured and swept cultured resonators were in the range 2 to 4 x 10 to the minus 9th power/wk during a 125 day period. The cultured units possessed a slightly higher average rate, 3.4 x 10 to the minus 9th power/wk, than the swept cultured ones, 2.5 x 10 to the minus 9th power/wk. Two units designated as cultured quartz exhibited frequency shifts of -.000007 when exposed to .0000014 rads of irradiation from a Cs-137 source. Post irradiation aging was at a rate of 2.5 x 10 to the minus 8th power/wk, approximately 8 times the normal rate. These units, because of the frequency shifts appear to be natural quarts improperly designated. Cultures swept units, similarly irradiated, exhibited no appreciable frequency shift or post irradiation aging. One 3 Mc unit of swept cultured quartz exhibited virtually no change in aging rate as a result of continuous drive at a 400 microamp level. An ultrasonic bonding method for welding aluminum ribbon to aluminum plated resonators was developed and gave strain free bonds and resonators of high Q, .0000015, and of low unwanted mode intensity.

AD-623 715 Fld. 9/1
CFSTI Prices: HC $1.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
A METHOD FOR DETERMINING KLYSTRON GAP CAPACITANCES.
Technical rept.,
by Arthur Gottfried, and Arthur Wachtenheim.
Aug 65, 18p. Rept. no. ecom-2623
Proj. DA-1P6-22001-A-055 Task 1P6-22001-A-055-04

Unclassified report

Descriptors: (*Klystrons, Capacitance), Perturbation theory, Electric fields, Determination, Test methods, Resonant frequency

The report describes a perturbation method used to determine the gap capacitances of a two-gap, supporteddrift-tube klystron. The effect of fringing fields on the capacitances is taken into account by perturbing the gaps with dielectric material. The method discussed in this report is applicable to either equal or unequal gaps. (Author)

AD-623 716 Fld. 9/1, 13/8
CFSTI Prices: HC $2.00 MF $0.50
REEVES-HOFFMAN DIV DYNAMICS CORP OF AMERICA CARLISLE PA
SINGLE SIDEBAND QUARTZ CRYSTAL UNITS FOR VHF APPLICATIONS (METAL ENCLOSURES).
Quarterly progress rept. no. 1, 15 May-30 Jul 65,
by George E. Ritter. 30 Jul 65, 41p. Contract DA-28-043-AMC-01325 (E) Proj. DA-1P6-22001-A-058 Task 01

Unclassified report

Descriptors: (*Quartz resonators, Very high frequency), Glass, Adhesives, Sidebands, Single sideband communication systems, Reliability (Electronics), Brazings, Bonding, Seals, Hermetic seals, Cladding, Iron alloys, Nickel alloys, Cobalt alloys

Coldweld enclosure parts of the HC-6 and transistor configuration which will withstand high bakeout temperatures are difficult to secure. Some brazing is being attempted and design of the two types of enclosures utilizing a compatible glass-to-metal seal is underway. Preliminary tests using the thermocompression bonding apparatus resulted in a need for modification of the equipment. Several attempts were made using glass bonding

techniques with one bond producing favorable results. Quartz resonator designs have been initiated. (Author)

AD-623 717 Fld. 9/1, 13/8
CFSTI Prices: HC $1.00 MF $0.50
CLEVITE CORP BEDFORD OHIO PIEZOELECTRIC DIV
PRODUCTION ENGINEERING MEASURE FOR CERAMIC FILTERS.
Quarterly rept. no. 9, 30 Mar-29 Jun 65, by A. Lungo. 29 Jun 65, 25p. Contract DA-36-039-AMC-0147 (E)

Unclassified report

See also AD-615 760.

Descriptors: (*Ceramic materials, Filters (Electromagnetic wave)), (*Filters (Electromagnetic wave), Ceramic materials), Resonators, Tuning devices, Manufacturing methods, Piezoelectric cyrstals, Machining, Disks, Processing, Tests

A status report is presented on the fabrication of the production fixtures. Difficulties encountered in fabricating filter sub-assemblies at 1.75 Mc, 4.3 Mc, and 6.0 Mc are presented and discussed. Also, minor modifications to the cartridge designs are discussed which should lead to simplification of the filter assembly. Additional potential problem areas have appeared which are expected to add to the difficulties already anticipated in meeting contract specifications. These new problem areas are discussed. (Author)

AD-623 851 Fld. 9/1
CFSTI Prices: HC $2.00 MF $0.50
RADIO CORP OF AMERICA NEW YORK COMMUNICATIONS SYSTEMS DIV
HIGH PERFORMANCE THIN FILMS FOR MICROCIRCUITS (CAPACITORS).
Quarterly progress rept. no. 1, 1 Mar-31 May 65, by Franz Huber, and W. Witt. 30 Jun 65, 33p. Rept. no. cr-65-419-22
Contract DA-28-043-AMC-01230 (E) Proj. DA-1C0-24401-A-112-04

Unclassified report

Descriptors: (*Capacitors, Films), (*Films, Microminiaturization (Electronics)), (*Microminiaturization (Electronics), Circuits), Metal films, Sputtering, Hafnium, Anodic coatings, Capacitance, Dielectric films, Hafnium compounds, Oxides, Thickness

A basic hafnium sputtering system was designed and constructed to accommodate a 6 1/2 in. x 6 1/4 in. hafnium cathode. Sputtered hafnium films were deposited on microscope slides and anodized. Over 100 Hf-Hf02-A1 capacitor structures were fabricated and tested. Capacitance per unit area, dissipation factor, and temperature characteristic measurements were taken at 1 kc/s, and the results of these measurements are presented with corresponding data on Ta205 and La2Ti207 for comparison purposes. (Author)

AD-623 897 Fld. 9/1
CFSTI Prices: HC $1.00 MF $0.50
SPRAGUE ELECTRIC CO NORTH ADAMS MASS
FEASIBILITY STUDY OF METAL BASE TRANSISTOR.
Quarterly rept. no. 2, phase 2, 30 Apr-31 Jul 65, by J. J. Casey, F. L. Vogel, and P. M. Kennedy. 31 Jul 65, 21p. Rept. no. 3
Contract DA-28-043-AMC-00168 (E) Proj. DA-1P6-22001-A-056

Unclassified report

See also AD-619 143.

Descriptors: (*Transistors, Metal films), Films, Silicon, Molybdenum, Attenuation, Microwave equipment, Semiconductors, Sandwich construction, Vapor plating, Epitaxial growth, Molybdenum compounds, Chlorides, Diodes (Semiconductor), Feasibility studies, Electron diffraction analysis, Electron microscopy

Techniques for obtaining MoCl5 that is more highly purified for use as a vapor source have been developed and implemented. Deposits made with these sources have been investigated by electron diffraction and electron microscopy. Initial experiments have indicated that lowtemperature epitaxial growth of silicon layers will probably be feasible if growth uniformity can be maintained. Other experiments have shown that even very thin layers of deposited molybdenum retain their metallic character after being subjected to temperatures considered feasible for subsequent epitaxial growth. Measurement of photoresponse in molybdenum-silicon diodes has continued. Changes in the measurement equipment have engendered improved results, but measurements in the infrared spectrum still present difficulties in detection. (Author)

AD-623 903 Fld. 9/1
CFSTI Prices: HC $2.00 MF $0.50
GENERAL ELECTRIC CO AUBURN N Y SEMICONDUCTOR PRODUCTS DEPT
RESEARCH AND DEVELOPMENT OF SILICON CONTROLLED RECTIFIERS FOR HIGH FREQUENCY AMPLIFIER APPLICATIONS.
Quarterly progress rept. no. 4, 16 Jul-16 Oct 65. 16 Oct 65, 36p. Contract NObsr-91299 Proj. SR-0080304 Task 9348

Unclassified report

See also AD-619 049.

Descriptors: (*Silicon controlled rectifiers, High frequency), Amplifiers, Specifications, Performance (Engineering), Electric currents, Thermal analysis

The current rating and transient temperature distribution of the device are discussed, followed by a description of the cathode pattern employed. Electrical test data on the state-of-the-art devices and other devices constructed during the quarter are also presented. (Author)

AD-623 905 Fld. 9/1
CFSTI Prices: HC $2.00 MF $0.50
LINDE DIV UNION CARBIDE CORP PARMA OHIO
RESEARCH AND DEVELOPMENT WORK ON DEVELOPMENT OF THIN ORGANIC ROLLED FILM CAPACITOR.
Quarterly progress rept. no. 6, 1 May-31 Jul 65, by J. R. Hutzler. 31 Jul 65, 26p. Contract NOBsr-89519

Unclassified report

See also AD-608 507.

Descriptors: (*Capacitors, Dielectric films), (*Dielectric films, Capacitors), Foils, Plastic coatings, Capacitance, Reliability (Electronics), Cleaning, Configuration, Surface properties, Life expectancy, Flame spraying, Contamination, Electric insulation, Aluminum

Progress is reported on a program to improve the characteristics of parylene coated foil capacitor and to develop a metallized parylene capacitor capable of operating over the temperature range of -55C to 125C at a rated voltage of 100 VDC, whose capacitance volume ratio is one-half that of a 50 volt metallized Mylar capacitor. Such capacitor to exhibit a dissipation factor less than 0.25%; 250 megohm microfarad minimum insulation resistance at 125C; temperature coefficient less than 300 ppm/C; 200% dielectric voltage withstand; less than 5% change in capacitance after life. Topics include: parylene coated foil capacitors (improved cleanliness and smoothness of substrate foil, effects of core material and configuration, case insulation); parylene coated metallized capacitors (design considerations, capacitor web development).

AD-623 957 Fld. 9/1
CFSTI Prices: HC $6.00 MF $1.25
UNIVAC BLUE BELL PA
INVESTIGATION OF FAULT DIAGNOSIS BY COMPUTATIONAL METHODS FOR MICROCIRCUITS.
Final rept. 20 Oct 64-19 Nov 65, by L. Mah, L. Buchsbaum, and T. J. B. Hannom. Nov 65, 253p. Contract AF33 (615)-2094
Proj. AF-8119 Task 811927
APL TR-65-111

Unclassified report

Descriptors: (*Circuits, Microminiaturization (Electronics)), (*Microminiaturization (Electronics), Circuits), (*Failure (Electronics), Checkout procedures), Integrated circuits, Digital computers, Programming (Computers), Graphics, Flow charting

This report describes the computational techniques formulated to extend the methods of automatically isolating faults in electronic circuitry to the level of a micromodule. The micromodule may consist of a single component or it may itself be a microcircuit consisting of several active and passive components. The techniques developed are oriented towards analog circuits. All circuit equations used in the diagnosis are generated by a digital computer from the specification of the circuit schematic in coded form, and from the nominal values and tolerances of all circuit components. Three (3) diagnostic techniques are implemented. Two of the techniques presented utilize a digital computer to implement the diagnosis, whereas the third technique utilizes precomputed network measurement bands and a manual graphic method for fault diagnosis. (Author)

AD-623 978 Fld. 9/1
CFSTI Prices: HC $1.00 MF $0.50
CLEVITE CORP BEDFORD OHIO PIEZOELECTRIC DIV
PRODUCTION ENGINEERING MEASURE FOR CERAMIC FILTERS.
Quarterly rept. no. 10, 30 Jun-29 Sep 65, by A. Lungo. 29 Sep 65, 14p. Contract DA-36-039-AMC-01471 (E)

Unclassified report

See also AD-623 717.

Descriptors: (*Radiofrequency filters, Ceramic materials), (*Ceramic materials, Filters (Electromagnetic wave)), (*Filters (Electromagnetic wave), Ceramic materials), (*Resonators, Filters (Electromagnetic wave)), Manufacturing methods, Tuning devices, Tests, Electrodes, Piezoelectric crystals, Intermediate frequency

During this period effort was directed toward establishing a pre-pilot production run of ceramic resonators. Difficulties encountered in the use of the production electroding, poling, and tumble tuning fixtures are presented and discussed. Also, modifications to the production fixtures are listed. (Author)

AD-623 985 Fld. 9/1
SASKATCHEWAN UNIV SASKATOON DEPT OF ELECTRICAL ENGINEERING
THEORY OF FOUR-TERMINAL DOUBLE-DIFFUSED FIELD-EFFECT TRANSISTORS.
Revised ed., by Richard S. C. Cobbold. 22 Mar 65, 6p. Contract DRB-5501-32

Unclassified report

Revision of manuscript received 11 Jan 65.

Availability: Published in IEEE Transactions on Electron Devices VED-12 N6 P302-7 Jun 1965. Copies to DDC users only.

Descriptors: (*Transistors, Theory), Doping, Diffusion, Performance (Engineering), Numerical analysis

Measurements on 4-terminal double-diffused field-effect transistors show considerable dissimilarity in the control characteristics of each gate, which can only be explained on the basis of a nonuniform channel doping. By using a linear approximation to the actual form of the actual form of the channel doping, a theory of these devices in the pinchoff region is developed and compared with experimental observations. For the devices used, the agreement is extremely good in that it accurately predicts the ratios of the two transconductances and their variation with voltage. It is observed that the transconductance of the more heavily doped gate (gate 1) exhibits a nearly linear variation with voltage applied to the other gate and that the linearity is maintained over a wide range of gate 1 voltages. Such a property could be usefully exploited in automatic gain control systems. (Author)

AD-624 018 Fld. 9/1, 9/5
CFSTI Prices: HC $2.00 MF $0.50
BENDIX CORP DAVENPORT IOWA PIONEER-CENTRAL DIV
FREQUENCY TEMPERATURE COMPENSATION TECHNIQUES FOR QUARTZ CRYSTAL OSCILLATORS.
Quarterly rept. no. 7, 1 Mar-31 May 65,
by R. H. Bangert. 5 Aug 65, 40p. Rept. no. publication-3392-65
Contract DA-36-039-AMC-02282 (E) Proj. DA-1P6-22001-A-058 Task 1P6-22001-A-058-02,1P6-22001-A-058-02-06
Unclassified report

See also AD-617 164.

Descriptors: (*Crystal oscillators, Quartz), Thermal stability, Frequency, Stability, Wiring diagrams, Networks, Programming (Computers), Thermistors

The work covered in this quarterly report involves the continued development of circuit techniques for the frequency temperature compensation of three quartz crystal oscillator groups, defined by specific frequency temperature stability characteristics by Electronics Command Requirement SCL-6657 dated 13 October 1964. The characteristics of three basic oscillator configurations - - common base, common emitter, and common collector - - are discussed as a result of a preliminary investigation. Data is shown on the comparative performances of each. Drive level effects on the frequency of a TCXO are shown for oscillators using a number of different crystals. A new computer approach based on the application of matrix techniques for the synthesis of compensation networks is discussed. The computer program is aimed at enabling complex networks to be synthesized with a minimum of effort. (Author)

AD-624 019 Fld. 9/1, 18/3, 18/8
CFSTI Prices: HC $3.00 MF $0.75
PHYSICS INTERNATIONAL CO SAN LEANDRO CALIF
PULSED X-RAY PROMPT GAMMA SIMULATOR.
Final rept.,
by Franklin C. Ford, Donald Martin, and Bernard Bernstein. 29 Nov 65, 64p. Rept. no. pifr-011
Contract AF04 (694)-496
Unclassified report

Descriptors: (*X ray tubes, Pulse generators), (*Nuclear explosions, Simulators), Gamma rays, Radiation damage, Shielding, Dosimetry, Luminescence, Noise (Radio)

Nuclear explosions are accompanied by the sudden release of large amounts of energy and highly penetrating nuclear radiation. Protection of a missile system or defense system against the nuclear environment of an enemy nuclear counterburst requires evaluation of the vulnerability to determine possible preventive methods. A pulsed X-ray system was selected as preferable for prompt-gamma simulation. The entire pulsed X-ray complex integrates the functions of the X-ray pulser, radiation shielding, rf shield structures, control and diagnostic systems, and dosimetry, providing a convenient transient radiation effects test facility. The specifications and other data pertinent to the major components and subsystems of the pulsed X-ray facility, as well as to the dosimetry systems, are discussed.

AD-624 079 Fld. 9/1
CFSTI Prices: HC $2.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
ANALYSIS OF A DISTRIBUTED COUPLING STRIP LINE CIRCULATOR.
Research rept.,
by Yoshihiro Konishi. 31 Jul 63, 39p. Rept. no. PIBMRI-1160-63
Contract AF-AFOSR-453-63 AFOSR 65-1722
Unclassified report

Descriptors: (*Waveguide circulators, Analysis), Transmission lines, Dielectrics, Ferrites, Field theory, Circuits, Design

A new type of circulator - the distributed-coupling strip line circulator - is proposed and analysed. The equivalent circuit of the circulator is developed, and design formulas are derived for calculating the values of the elements of the equivalent circuit. (Author)

AD-624 111 Fld. 9/1, 20/12
CFSTI Prices: HC $2.00 MF $0.50
AIRBORNE INSTRUMENTS LAB DEER PARK N Y
FREQUENCY MULTIPLIER.
Quarterly rept. no. 3, 1 Jun-31 Aug 65,
by G. P. Kurpis, and J. J. Taub. 31 Aug 65, 32p.
Contract DA-28-043-AMC-00438 (E) Proj. DA-1P6-22001-A-058
Unclassified report

See also AD-619 085.

Descriptors: (*Frequency multipliers, Semiconductors devices), (*Semiconductors devices, Frequency multipliers), Extremely high frequency, Varactor diodes, Diodes (Semiconductor), Microwave equipment, Performance (Engineering), Tests, Cavity resonators, Waveguides, Design

During this quarter, the following frequency multipliers were designed and fabricated: 50 to 100 Gc cross-guide type varactor doubler, 25 to 50 Gc in-line type varactor doubler, 8.333 to 25 Gc resonant cavity-type varactor tripler. Preliminary tests on the two varactor doublers were performed. Small outputs were obtained in both cases and both doublers are presently undergoing slight modifications to improve their operation efficiency. A 50 to 100 Gc in-line type varistor doubler also has been tested. The results of this test surpassed the varactor doubler performance by a small margin. (Author)

AD-624 115 Fld. 9/1, 9/5
CFSTI Prices: HC $1.00 MF $0.50
MSI ELECTRONICS INC RICHMOND HILL N Y
BURNOUT RESISTANT X BAND HOT CARRIER DETECTORS.
Quarterly rept. no. 1, 1 Jul-30 Sep 65,
by D. Scaringella, and C. Shulman. 15 Oct 65, 15p. Contract DA-28-043-AMC-01395 Proj. DA-1P6-22001-A-056
Unclassified report

Descriptors: (*Diodes (Semiconductor), X band), (*X band, Demodulators), (*Carriers (Semiconductors), Diodes (Semiconductor)), Thermoelectricity, Voltage, Electric currents, Radio signals, Detectors, Reliability (Electronics), Radiofrequency power, Rectifiers

Measurements were performed on .004 inch dia. N Type Silicon hot carrier detectors. These detectors were 3 to 14 db less sensitive than that predicted by theoretical analysis. Some detectors exhibited a reversal in polarity when the RF power incident on the detector was increased from minimum detectable signal to approximately 10 mw. The rectification phenomena exhibited by these devices can, in some instances, be related to the static E-I characteristics, but generally static considerations are not enough. All hot carrier diodes exhibited some degree of non-linearity. Efforts are being made to detect the sources of non-linearity with the objective of establishing the relationship, if any, between rectification and static characterization. (Author)

AD-624 153 Fld. 9/1, 13/8
CFSTI Prices: HC $1.00 MF $0.50
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV
HIGH SPEED SEMICONDUCTOR SWITCH (TWO TERMINAL) AND HIGH SPEED SEMICONDUCTOR SWITCH (GATE).
Quarterly rept. no. 9, 29 May-28 Aug 65,
by B. G. Burlingame. 28 Aug 65, 19p. Contract DA-36-039-AMC-01475 (E)
Unclassified report

See also AD-619 770.

Descriptors: (*Semiconductor devices, Manufacturing methods), (*Electronic switches, Semiconductor devices), Gates (Circuits), Switching circuits, Gold, Diffusion, Reliability (Electronics), Electric terminals, Dies, Voltage, Performance (Engineering)

Results are given that were obtained from the use of higher gold diffusion temperatures and a decrease in starting material resistivity, as well as a change in geometry of the three-terminal die. Changes in measurement techniques and conditions are discussed. Summaries of device characteristics are also tabulated. (Author)

AD-623 727 **See Fld. 14/5**

AD-623 908 **See Fld. 17/2**

AD-623 912 **See Fld. 9/3**

AD-623 913 **See Fld. 20/9**

AD-623 914 **See Fld. 14/5**

AD-623 960 **See Fld. 17/2**

AD-623 963 **See Fld. 9/2**

AD-624 055 **See Fld. 20/12**

AD-624 077 **See Fld. 20/3**

AD-624 081 **See Fld. 20/9**

AD-624 095 **See Fld. 20/12**

AD-624 121 **See Fld. 5/1**

AD-624 137 **See Fld. 20/1**

9/2. COMPUTERS

AD-623 736 Fld. 9/2, 5/2
CFSTI Prices: HC $1.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
TEXTIR: A USERS' MANUAL.
by Jules Farell. 8 Oct 65, 14p. Rept. no. tm-2392/001/00
Unclassified report

See also AD-615 763.

Descriptors: (*Information retrieval, Programming (Computers)), (*Programming (Computers), Information retrieval), Instruction manuals, Language, Programming languages, English language

This document describes the operation of TEXTIR, a natural language Text Indexing and Retrieval system, on the SDC-ARPA Time-Sharing System using the Q-32. It lists the step-by-step processes necessary to index a prestored text and then query the resulting organized data base using natural language qustions, and provides an Appendix giving the SYNTHEX Keypunch Rules. (Author)

AD-623 738 Fld. 9/2
CFSTI Prices: HC $1.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
ADVANCED COMPUTER TECHNIQUES APPLICABLE TO SPACE AND RANGE PROBLEMS,
by Gerald D. West. 25 Oct 65, 17p. Rept. no. sp-2197

Unclassified report

Descriptors: (*Computers, Operation), Space flight, Ranges, Programming languages, Programming (Computers), Standardization, Multiple operation, Effectiveness

Computer installations serving range and space needs are characterized by a large number of user organizations, a variety of processing tasks, and rapid growth. These characteristics tend to result in problems in computer utilization. Certain advanced programming concepts such as time-sharing and multi-processing seem to provide the means for alleviating the computer utilization problems being experienced by range and space support installations. These concepts are a part of the methodology of the computer applications field, and are distinct from the functional requirements of the computer user. (Author)

AD-623 758 Fld. 9/2, 6/4, 12/1
PITTSBURGH UNIV PA
LIMITATIONS OF THE CURRENT STOCK OF IDEAS ABOUT PROBLEM SOLVING,
by Allen Newell. 1964, 15p. Contract SD-146

Unclassified report

Availability: Published in Electronic Information Handling, P195-208 1965. Copies to DDC users only.

Descriptors: (*Problem solving, Programming (Computers), (*Programming (Computers), Problem solving), Pattern recognition, Mathematical prediction, Sequences, Mathematical logic, Artificial intelligence

The current field of problem solving by computers is thought to consist of a series of ideas about how to represent a problem. If a problem can be cast into one of these representations in a natural way, then it is possible to manipulate it and stand some chance of solving it. Different approaches are not easily translatable, one into the other. The advantages of these approaches are summarized by describing the kinds of problems which can be easily so represented. It must be admitted that no single representation can be stretched too far. There is no useful representation of possible representations in existence currently.

AD-623 771 Fld. 9/2
CFSTI Prices: HC $2.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
SELF-INSTRUCTIONAL JOVIAL MANUAL: CHAPTERS 1, 2, 3 AND 4.
Professional paper,
by Donald I. Cutler. 15 Oct 65, 50p. Rept. no. sp-2214/000/00

Unclassified report

Descriptors: (*Programming languages, Instruction manuals), Punched cards

Presents a manual for JOVIAL programming language training which does not require any previous programming knowledge on the part of the student. This arrangement presents the advantages of sensitivity to individual learning abilities, and independence from a formal class. Each chapter contains review exercises followed by the answers to the questions presented in the exercises. Chapter I is an introduction to JOVIAL, Chapter II describes items, the assignment statement and the four basic arithmetic operations of JOVIAL. Chapter III presents JOVIAL coding formats and a representation of Hollerith information on punched cards. Chapter IV discusses the 'If' and 'Goto' statements, statement labels and compound statements. (Author)

AD-623 773 Fld. 9/2
CFSTI Prices: HC $3.00 MF $0.75
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
JTS USER'S GUIDE (OPERATIONAL DESCRIPTION).
Technical memo,
by Phyllis R. Kennedy. 11 Aug 65, 73p. Rept. no. tm-1577/002/00
Contract SD-97

Unclassified report

Descriptors: (*Compilers, Handbooks), (*Programming languages, Compilers)

The document is a user's guide that provides the user with an operating description of the JTS compiler. It describes the user's interactions with the compiler in a time-sharing environment. While the guide does not include a complete description of the JTS language, it does include reference tables listing the JTS language forms and library procedures. (Author)

AD-623 796 Fld. 9/2
CFSTI Prices: HC $2.00 MF $0.50
LINCOLN LAB MASS INST OF TECH LEXINGTON
AN EXPERIMENTAL ON-LINE DATA STORAGE AND RETRIEVAL SYSTEM.
Revised ed.,
by John F. Nolan, and Amedio W. Armenti. 24 Sep 65, 42p. Rept. no. tr-377
Contract AF19 (628)-5167 ,Nonr-4102 (01) ESD TDR-65-45

Unclassified report

Revision of manuscript submitted 3 Feb 65.

Descriptors: (*Data storage systems, Programming (Computers)), (*Programming (Computers), Data storage systems), (*Data, Information retrieval), Data processing systems, Computers, Man-machine systems

This report describes an experimental program system designed to test and demonstrate on-line storage and retrieval of formatted data based on complete internal descriptions of the files. The use of internal descriptions allows each user (who need not be a trained programmer) to define, modify, and cross-associate data files to suit his particular needs. The experimental program system was implemented by remote use of the Compatible Time-Sharing System (CTSS) facilities of Project MAC at the Massachusetts Institute of Technology. (Author)

AD-623 804 Fld. 9/2
CFSTI Prices: HC $5.00 MF $1.00
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
LISP PRIMER: A SELF-TUTOR FOR Q-32 LISP 1.5.
Technical memo.,
by Clark Weissman. 14 Jun 65, 152p. Rept. no. tm-2337/010/00
Contract SD-97

Unclassified report

Descriptors: (*Programming languages, Instruction manuals)

The document is a self-tutor for LISP 1.5 programming, particularly for on-line Q-32 LISP 1.5. Material is organized into chapters that, by discussion and example, progressively expand the student's understanding of the language and ability to write programs in the language. A carefully selected and graduated set of exercises for use on-line is provided as an integral part of each chapter. Computer-checked answers for each exercise are also provided as a separate appendix. The document is not an exhaustive treatise on LISP 1.5, but, rather, a practical primer that provides the serious student with a solid foundation for understanding the programming language and system. He may then easily supplement his knowledge from other sources. (Author)

AD-623 861 Fld. 9/2
CFSTI Prices: HC $4.00 MF $1.00
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
THE JOVIAL MANUAL. PART II. THE JOVIAL (J3) GRAMMAR AND LEXICON.
Technical memo.,
by Millard H. Perstein. 20 Oct 65, 142p. Rept. no. tm-555/002/04
AD

Unclassified report

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Programming languages, Handbooks), Programming (Computers), Language, Analysis, Grammars, Syntax, Semantics

This is the reference manual for the J3 version of the JOVIAL language. J3 is the full language. This manual defines the full syntax and semantics without drawing fine distinctions between the two aspects. This revision of the manual, revision 4, slightly amplifies revision 3 and corrects the index. It contains considerably more details about the semantics than do revisions 2 and earlier. (Author)

AD-623 924 Fld. 9/2, 6/4
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS DATA SCIENCES LAB
A PARAPROPAGATION PATTERN CLASSIFIER,
by Herbert A. Glucksman. Sep 65, 19p. Rept. no. 80
Proj. AF-4641 Task 464104
AFCRL 65-69

Unclassified report

Availability: Published in IEEE Transactions on Electronic Computers VEC-14 N3 P434-43 Jun 1965.

Descriptors: (*Pattern recognition, Computer logic), (*Computer logic, Pattern recognition), Integrated circuits, Microminiaturization (Electronics), Gates (Circuits), Data storage systems, Artificial intelligence, Decision theory

A matrix of simple, identical intercommunicating cells is the core of a pattern classifier that can sort two-valued, two-dimensional patterns, such as alphabetic symbols. The matrix yields information about a pattern mapped on its cells by reporting whether or not a threshold exceeds the number of cells that remain in a "zero" state after a sequence of operations that include directed cell-to-cell propagations of change of state. The pattern furnishes a barrier to the propagations. The testing process is a program written to suit some alphabet of pattern classes. An automatic sequencer for controlling the testing process is described. The testing operations are few, but they can be combined in tests for an abundance of features of great variety. A computer simulation, using a single decision tree, classifies the commonest press and typewriter fonts. A small manually sequenced model employing integrated microelectronic cells has been built. (Author)

AD-623 938 Fld. 9/2, 5/2
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
THE CATALOG: A FLEXIBLE DATA STRUCTURE FOR MAGNETIC TAPE,
by Martin Kay, and Theodore Ziehe. Oct 65, 32p. Rept. no. rm-4645-PR
Contract AF49 (638)-700

Unclassified report

Descriptors: (*Computer storage devices, Magnetic tape), (*Magnetic tape, Computer storage devices), (*Catalogs, Magnetic tape), Data processing systems, Data, Computers, Information retrieval, Computational linguistics, Libraries

An outline of a generalized storage scheme for large files of highly structured data (or catalogs) and a description of their realization on magnetic tape. Each datum, large or small, is assigned to one of a number of data classes of which a user may define any number. The overall organization of a catalog is given by a map that imposes a tree structure on the set of data classes. Catalogs may participate as individual data in other catalogs so that the structure of a file may be recursive. A flexible addressing scheme not only facilitates the retrieval of data and sets of data in response to easily formulated requests but also provides a basis for updating catalogs. General procedures called transformations can be used to derive catalogs with new structures from existing catalogs. (Author)

AD-623 945 Fld. 9/2
CFSTI Prices: HC $2.00 MF $0.50
LINCOLN LAB MASS INST OF TECH LEXINGTON
ANALOG GENERATOR FOR REAL-TIME DISPLAY OF CURVES.
Technical rept.,
by T. E. Johnson. 28 Jul 65, 26p. Rept. no. tr-398
Contract AF19 (628)-5167 Proj. AF-649L ESD TDR-65-31

Unclassified report

Descriptors: (*Analog computers, Display systems), (*Geometric forms, Display systems), Cathode ray tubes, Cathode ray tube screens, Digital computers, Digitalto-analog converters, Graphics, Real time, Amplifiers, Transistors, Switching circuits, Potentiometers, Direct current

The report discusses the design and performance of a low-cost analog generator capable of forming rotated cubics and conics for real-time display on a cathode-ray tube. Use of high-bandwidth operational amplifiers and field-effect transistors in the analog switches allows fast and accurate operation. (Author)

AD-623 963 Fld. 9/2, 9/1
CFSTI Prices: HC $1.00 MF $0.50
BOEING CO SEATTLE WASH AEROSPACE GROUP
COMPARISON AND EVALUATION OF THREE AUTOMATED CIRCUIT ANALYSIS PROGRAMS: PREDICT, NET-1, AND CIRCUS,
by R. H. Dickhaut. May 65, 13p.

Unclassified report

Descriptors: (*Programming (Computers), Circuits), (*Circuits, Analysis), (*Radiation damage, Circuits), Electronic equipment, Transistors, Diodes (Semiconductor), Topology

All three programs appear to have outstanding capabilities for a certain type of work. PREDICT is impressive for its flexibility in handling arbitrary mathematical expressions, and thus is ready-made for experimental work with new and different device models, or for modifications of ones already known. The properties of such models can, therefore, be easily determined and studied. NET-1 shows its advantage in the area of production circuit analysis and design. The circuit designer is provided with, upon request, a power supply failure analysis which alerts the designer as to whether supply failure may jeopardize the transistors and diodes in the circuit. CIRCUS has capabilities uniquely fitted to production radiation effects work.

AD-624 020 Fld. 9/2, 17/2
CFSTI Prices: HC $2.00 MF $0.50
RABINOW ELECTRONICS INC ROCKVILLE MD
HIGH SPEED MESSAGE ENTRY EQUIPMENT.
Quarterly progress rept. no. 5, 1 Jul-30 Sep 65,
by Alfred Breslauer, and Prescott Palmer. 30 Sep 65, 28p. Contract DA-28-043-AMC-00091 (E)

Unclassified report

See also AD-614 643.

Descriptors: (*Reading machines, Optical scanning), (*Character recognition, Reading machines), (*Optical equipment, Reading machines), (*Information theory, Reading machines), Computer logic, Input-output devices, Pattern recognition, Digital computers, Coding, Systems engineering, Communication systems

The report contains a summary of work performed for the development and fabrication of an Advanced Development model of equipment for reading typed and printed pages and converting the information into electrical code form for communications applications. The report contains a technical discussion of the work performed to date with particular emphasis on work performed during the reporting period. The report has been divided into five parts namely: Paper Handling System, Optical System, Reading Logic System, Buffer System, and Output System. Discussion covers the design progress, the fabricating progress, and the checkout and testing progress on each of these subsystems. (Author)

AD-624 053 Fld. 9/2, 17/9, 19/5
CFSTI Prices: HC $3.00 MF $0.50
FRANKFORD ARSENAL PHILADELPHIA PA FIRE CONTROL ENGINEERING DIRECTORATE
COMPUTER, GUN DIRECTION, M18 (FADAC) APPLICABILITY IN DEFENSE COMMUNICATION SATELLITE ANTENNA POSITIONER SYSTEM.
Final rept. for Dec 64-Jul 65,
by Helen Smolen. Oct 65, 56p. Proj. DA-1R322101D253 FA R-1777

Unclassified report

Descriptors: (*Satellites (Artificial), Tracking), (*Computers, Tracking), (*Tracking, Satellites (Artificial)), Real time, Programming (Computers), Gun directors, Communication satellites (Active), Military satellites, Antennas, Fire control computers

The study described in the report was undertaken at the request of the U. S. Army Satellite Communications Agency, Ft. Monmouth, N. J., to determine the suitability of Computer, Gun Direction, M18 (FADAC), as the control unit in an Antenna Position Programmer System designed to acquire and track earth satellites. Results of the study show that FADAC has the capability of performing the required functions, can interface with the remainder of the system, and, at operator's option, either output control data to the antenna positioner within the real time specified, or generate a punched paper tape. (Author)

AD-624 110 Fld. 9/2, 5/2
CFSTI Prices: HC $2.00 MF $0.50
LINCOLN LAB MASS INST OF TECH LEXINGTON
ON LINE DOCUMENTATION OF THE COMPATIBLE TIME-SHARING SYSTEM.
Technical rept.,
by Joel M. Winett. 12 May 65, 50p. Rept. no. tr-387
Contract AF19 (628)-500 ,Nonr-4102 (01) Proj. AF-649L ESD TRD-65-68

Unclassified report

Descriptors: (*Programming (Computers), Documentation), Compatibility, Information retrieval, Data storage systems, Programming languages, Computers

The dissemination of information about computer programs is hampered because of the lack of conformity in documentation, the delays inherent in any distribution system, and the inability to select only desired information without being flooded with information which is not of present interest. An on-line system for storing and retrieving information about the programs associated with the Compatible Time-Sharing System (CTSS) has been developed to be included as a CTSS command. This system will help to document the system commands, supervisor entries, library subprograms, and public programs. These types of programs have been chosen since there is an urgent need for having this documentation available on demand, i.e., on-line. (Author)

AD-624 133 Fld. 9/2, 3/3, 17/7
CFSTI Prices: HC $3.00 MF $0.50
RAND CORP SANTA MONICA CALIF
A COMPUTING PROGRAM FOR TRACKING ERROR ANALYSIS OF KEPLERIAN TRAJECTORIES,
by R. T. Gabler, and S. J. Belcher. Oct 65, 51p. Rept. no. rm-4740-PR
Contract AF49 (638)-700

Unclassified report

Descriptors: (*Programming (Computers), Tracking), (*Tracking, Errors), (*Orbital trajectories, Determination), Celestial mechanics, Inertial navigation, Statistical analysis, S-matrix

This memorandum presents a computer program for determining the accuracy of instrumentation used in estimating the position and velocity of a vehicle in nearKeplerian motion. The accuracy with which two coordinates of the tracking stations may be estimated may also be determined. The information from a tracking network which represents an overdetermination of trajectory parameters is assumed to be combined in a general least-squares sense. The results appear as covariance matrices, confidence regions and standard deviations. The computer routine described here computes all partial derivatives from analytic formulas and provides for possible tracking-station motion limited to great-circle paths. (Author)

AD-624 152 Fld. 9/2, 6/4
CFSTI Prices: HC $3.00 MF $0.75
BOLT BERANEK AND NEWMAN INC CAMBRIDGE MASS
CYCLOPS-2: A COMPUTER SYSTEM THAT LEARNS TO SEE.
Final scientific rept. 1 Jul 64-13 Oct 65,
by Burton H. Bloom, and Thomas Marill. 13 Oct 65, 68p. Rept. no. tr65-RD1-1
Contract AF19 (628)-4306 Proj. AF-4641 Task 4641-02
AFCRL 65-73

Unclassified report

Descriptors: (*Pattern recognition, Programming (Computers)), (*Programming (Computers), Pattern recognition), (*Learning, Programming (Computers)), Digital computers, Analysis, Artificial intelligence, Computer storage devices, Information retrieval

The design of the Cyclops-2 System is discussed in detail. When completed, the system will have the ability to recognize visual shapes composed of arbitrary lines, to analyze scenes composed of such shapes, and to learn, i.e., to improve its own performance by examining correctly labeled examples. The techniques embedded in the design are

quite general and can be applied to other recognition or learning situations than those Cyclops-2 was specifically designed to handle. (Author)

AD-624 162 Fld. 9/2, 12/1
CFSTI Prices: HC $2.00 MF $0.50
PARKE MATHEMATICAL LABS INC CARLISLE MASS
SUBSTITUTION ALGEBRAS WITH FEEDBACK.
Scientific rept.,
by J. A. Riley. Aug 65, 47p. Rept. no. SR-1
Contract AF19 (628)-4790 Proj. AF-4608 Task 460805
AFCRL 65-71
Unclassified report

Descriptors: (*Input-output devices, Theory), (*Algebras, Input-output devices), (*Automata, Feedback), Functions, Set theory

The general theory of substitution algebras is extended so as to include devices with time-dependent input/output signals. Abstract notions of delay and feedback are defined, and their basic properties are investigated. Some of the principles of automata theory are given. The discussion is an amalgamation of several sources, and is included here for the purposes of comparison with the theory of substitution algebras with feedback. It is shown that in a certain sense, the two theories are co-extensive. (Author)

AD-623 723 See Fld. 12/2

AD-623 739 See Fld. 12/1

AD-623 769 See Fld. 5/7

AD-623 783 See Fld. 5/10

AD-623 824 See Fld. 17/7

AD-623 836 See Fld. 19/4

AD-623 877 See Fld. 20/8

AD-623 961 See Fld. 9/5

AD-624 132 See Fld. 9/5

AD-624 138 See Fld. 12/2

AD-624 141 See Fld. 12/2

AD-624 148 See Fld. 5/7

AD-624 157 See Fld. 12/2

AD-624 241 See Fld. 5/2

9/3. ELECTRONIC AND ELECTRICAL ENGINEERNG

AD-623 793 Fld. 9/3, 9/4, 9/5
CFSTI Prices: HC $3.00 MF $0.75
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
ELECTRONICS PROGRAM AT THE POLYTECHNIC INSTITUTE OF BROOKLYN.
Final rept.,
by Jerome Fox. 10 Jun 65, 86p. Rept. no. PIB-MRI-1277-65
Contract AF-AFOSR-62-295 AFOSR 65-1492
Unclassified report

Descriptors: (*Electronic equipment, Abstracts), Electromagnetism, Information theory, Control systems, Amplifiers, Waveguides, Oscillators, Lasers, Frequency modulation, Networks, Optimization, Microwave equipment, Radio receivers, Switching circuits, Radar equipment, Coupling circuits, Parametric amplifiers, Antennas, Transformation (Mathematics), Satellite attitude, Plasma physics

Abstracts are given of significant research results in electromagnetic theory and information processes. Contributions are listed of technical literature in the fields of control systems, electromagnetics, electrophysics, communication theory, and physics.

AD-623 912 Fld. 9/3, 9/1
CFSTI Prices: HC $2.00 MF $0.50
GEORGIA INST OF TECH ATLANTA ENGINEERING EXPERIMENT STATION
STUDY OF RECEIVER MIXER CHARACTERISTICS.
Quarterly rept. no. 1, 1 Jun-1 Sep 65,
by E. E. Donaldson,Jr., R. D. Trammell,Jr., and R. W. Moss. Sep 65, 37p. Rept. no. a-868-1
Contract DA-28-043-AMC-01426 (E) Proj. DA-1E6-20501-D-449 ECOM 01426-1
Unclassified report

Descriptors: (*Mixers (Electronics), Scientific research), (*Electromagnetic properties, Mixers (Electronics)), Theory, Demodulation, Spectrum signature, Phase shifters, Phase meters, Intermediate frequency amplifiers, Wiring diagrams, Diodes, Test equipment (Electronics), Test methods

Mixer phenomena and prediction techniques are reviewed in the light of advanced knowledge of nonlinear device characteristics. Measurement and analysis problems associated with the interdependence of mixer operating parameters are emphasized, and the inadequacies of current prediction schemes are discussed in relation to their application to operational receivers. Tests were performed to determine if the harmonic and response generating properties of nonlinear devices are functions of signal phase relationships. The measurement procedures and instrumentation necessary to measure such relationships are presented. Test results are shown which verify that variations in the phase relationships between the fundamental and harmonics of an injected signal cause radical variations in output harmonic and response levels. It is also shown that the phase of output responses are dependent upon mixer bias level. (Author)

AD-623 989 Fld. 9/3, 9/5
CFSTI Prices: HC $2.00 MF $0.50
SPRAGUE ELECTRIC CO NORTH ADAMS MASS
DEVELOPMENT OF CONTROLLABLE SELECTIVE AMPLIFICATION IN SILICON-BASED MICROCIRCUITRY.
Interim rept. no. 2, 15 Aug-15 Nov 65,
by Robert S. Pepper. 15 Nov 65, 30p. Contract AF33 (615)-2914
Unclassified report

Descriptors: (*Feedback amplifiers, Linear systems), (*Semiconductor devices, Feedback amplifiers), Molecular electronics, Microminiaturization (Electronics), Automatic gain control, Circuits, Transistors, Integrated circuits, Phase (Electronics), Phase shift, Gain, Temperature, Vidio amplifiers

Characterization studies of the Mark I AGC block have been completed. Simulation of the Mark II block in integrated form has been achieved through the use of a special interconnection mask applied to the Mark I unit. Evaluation of the simulated Mark II AGC block has begun. Development of a prototype stabilized gain block is continuing. It has been necessary to evolve a more comprehensive technique for evaluating the performance of the stabilized gain block, since first-order analysis yielded unsatisfactory results. Several models of the stabilized block have been built in integrated form, and evaluation of these devices has begun. A lowpass (video) amplifier has been breadboarded to verify the nested multiple-loop feedback design procedure. Evaluation of this breadboard model is under way. (Author)

AD-624 220 Fld. 9/3, 20/6, 20/9, 9/4, +
CFSTI Prices: HC $6.00 MF $1.50
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH CAMBRIDGE
RESEARCH LABORATORY OF ELECTRONICS: GENERAL PHYSICS, PLASMA DYNAMICS, AND COMMUNICATION SCIENCES AND ENGINEERING.
Quarterly progress rept. no. 79,
by H. J. Zimmermann, and G. G. Harvey. 15 Oct 65, 291p. Contract DA-36-039-AMC-03200 (E), AF33(615)-1083
Unclassified report

See also AD-620 083.

Descriptors: (*Physics, Reports), (*Plasma physics, Reports), (*Communication theory, Reports), (*Electronics, Scientific research), Molecular beams, Microwave spectroscopy, Radio astronomy, Infrared spectroscopy, Geophysics, Acoustics, Noise (Radio), Magnetohydrodynamics, Energy conversion, Data transmission systems, Speech transmission, Machine translation, Character recognition, Biophysics

Contents: Molecular beams; Microwave spectroscopy; Radio astronomy; Optical and infrared spectroscopy; Geophysics; Noise in electron devices; Physical electronics and surface physics; Physical acoustics; Plasma physics; Plasma electronics; Plasma magnetohydrodynamics and energy conversion; Statistical communication theory; Processing and transmission of information; Speech communication; Mechanical translation; Linguistics; Cognitive information processing; Communications biophysics; Computation research.

AD-624 223 Fld. 9/3
CFSTI Prices: HC $3.00 MF $0.75
NEW YORK UNIV N Y SCHOOL OF ENGINEERING AND SCIENCE
CABLE TESTERS AND FAULT LOCATORS. COMMERCIAL AND MILITARY.
Dec 63, 59p. Rept. no. sete-210/67
Contract NObsr-89288 Proj. SETE
Unclassified report

Descriptors: (*Electric cables, Test equipment), (*Measuring devices (Electrical ; electronic), Electric cables), Circuit testers, Automatic, Electrical properties, Electric insulation, Defects (Materials), Specifications, Costs

AD-624 225 Fld. 9/3, 9/4
CFSTI Prices: HC $1.00 MF $0.50
NEW YORK UNIV N Y SCHOOL OF ENGINEERING AND SCIENCE
ANTENNA TEST EQUIPMENT WITH MILITARY NOMENCLATURE ASSIGNMENTS,
by Harrison A. G. Stone. Jan 64, 19p. Rept. no. sete-210/70
Proj. SETE
Unclassified report

Descriptors: (*Antennas, Test sets), (*Test sets, Antennas), Classification, Test equipment, Test equipment (Electronics), Antenna radiation patterns, Radomes, Radar equipment, Catalogs

AD-624 226 Fld. 9/3
CFSTI Prices: HC $2.00 MF $0.50
NEW YORK UNIV N Y SCHOOL OF ENGINEERING AND SCIENCE
A SURVEY OF COMMERCIAL AND MILITARY NOMENCLATURED SPECTRUM ANALYZERS,
by Hayward W. Yong. Sep 64, 50p. Rept. no. sete-210/79
Contract NObsr-89288 Proj. SETE ,SF-0131701 Task 5599
Unclassified report

Descriptors: (*Test equipment (Electronics), Signals), Reviews, Spectrum analyzers, Pulse analyzers, Oscilloscopes, Display systems, Frequency analyzers, Spectrum signatures, Specifications, Analysis, Frequency

AD-624 234 Fld. 9/3
CFSTI Prices: HC $3.00 MF $0.75
NEW YORK UNIV N Y SCHOOL OF ENGINEERING AND SCIENCE
VECTOR AMPLITUDE AND PHASE MEASURING DEVICES,
by Jack Lustig. Oct 65, 86p. Rept. no. SETE-210/88
Contract NObsr-89288 Proj. SETE ,SF-0131701 Task 5599
Unclassified report

Descriptors: (*Measuring devices (Electrical + Electronic), Phase measurement), (*Phase measurement, Measuring devices (Electrical + Electronic)), Reports, Theory, Phase meters, Antenna radiation patterns, Plotters

Except for antennas, all of the equipments discussed are intended to measure electrical vectors having phase angles which are defined in terms of electrical degrees, and which represent the phase relationship of a voltage or current flowing within a circuit. Measurements upon electro-magnetic waves being propagated in space involve knowledge of a more complex set of vector relationships to completely determine the wave structure. Both geometrical and electrical angles are involved, and the electrical angles may involve both physical and electrical phase angles. The antenna pattern recorders listed herein represent a sampling of devices which are useful in measuring the variation of response (of an antenna) with respect to rotation about one or more controlled axes.

AD-624 235 Fld. 9/3, 14/2
CFSTI Prices: HC $4.00 MF $1.00
NEW YORK UNIV N Y SCHOOL OF ENGINEERING AND SCIENCE
PROJECT SETE.
Summary rept. for 25 Jun 56-15 Apr 63.
Nov 63, 145p. Rept. no. sete-213/81
Contract NObsr-89288
Unclassified report

Descriptors: (*Test equipment (Electronics), Military requirements), Department od Defense, Symposia, Automatic, Environmental tests, Analog-to-digital converters, Electric cables, Fluxmeters, Frequency meters, Solid state physics, Magnetrons, Vocabulary, Oscilloscopes, Power meters, Pulse analyzers, Recording systems, Transistors, Semiconductors, Simulators, Signal generators, Spectrum analyzers, Transducers, Voltmeters

Contents: Cross section of SETE correspondence and symposium activities: Sample Letters; SETE Recommendations; Third Test Equipment Symposium. Design course on automatic test equipment. Tabulations of SETE prepared documents: Complete Tabulation of SETE Documents; SETE Documents by Subject Matter; SETE Technical Documents Arranged by Equipment Type Headings.

AD-624 228 **See Fld. 14/2**

9/4. INFORMATION THEORY

AD-623 954 Fld. 9/4, 12/1
CFSTI Prices: HC $1.00 MF $0.50
STANFORD UNIV CALIF DEPT OF STATISTICS
INTERACTION INFORMATION IN MULTIVARIATE PROBABILITY DISTRIBUTIONS.
Technical rept.,
by Minoru Sakaguchi. 13 Sep 65, 18p. Rept. no. tr-54
Contract Nonr-225 (72) Proj. NR-042-993
Unclassified report

Descriptors: (*Information theory, Probability), (*Distribution theory, Information theory), Permutations, Stochastic processes, Multiplex

It is shown in this note that the entropy of a multivariate distribution can be expressed in terms of the sum of onedimensional marginal entropies, the sum of transmitted information between each pair of component variables, the sum of interaction information in trivariate component distributions, and so on. Using this result, the author gives a class of multivariate distributions having specified component densities and some preassigned association measure between some component variables. Proofs of equations and statements which are not so evident are also given.

AD-624 156 Fld. 9/4, 12/1
CFSTI Prices: HC $5.00 MF $1.00
NORTHEASTERN UNIV BOSTON MASS
PROPERTIES AND APPLICATIONS OF AUTOCORRELATION-INVARIANT FUNCTIONS.
Scientific rept.,
by Robert A. Gonsalves. Jun 65. 168p. Rept. no. sr-2
Contract AF19 (628)-3312 Proj. AF-4610 Task 461003
AFCRL 65-42
Unclassified report

Descriptors: (*Signals, Design), (*Communication theory, Statistical functions), (*Statistical functions, Communication theory), Invariance, Special functions (Mathematical), Integral transforms, Waveform generators

Properties and applications of autocorrelation invariant functions of interest to the communications engineer in the general area of signal design are presented.

AD-624 217 Fld. 9/4
CFSTI Prices: HC $4.00 MF $0.75
NORTHEASTERN UNIV BOSTON MASS
ORTHOGONAL SIGNALLING PULSES WITH THE SAME AUTOCORRELATION,
by Denis W. Fermental. Jun 65, 110p. Rept. no. scientific-3
Contract AF19 (628)-3312 Proj. AF-4610 Task 461003
AFCRL 65-46
Unclassified report

Descriptors: (*Signals, Design), (*Statistical functions, Communication theory), (*Communication theory, Statistical functions), Coding, Integral transforms, Polynomials

Two methods for synthesizing orthogonal code pulses with the same autocorrelation are presented. One method determines polynomials of differentiation that operate on a pulse to generate the code waveforms. It is shown that these polynomials determine the moments of the energy density spectrum of this pulse. Polynomials are presented for generating N code waveforms, and the moments of the associated energy density spectrum are determined, for any N. A method for constructing an energy density spectrum of a pulse with a specified sequence of moments is presented. A second approach for constructing orthogonal pulses is explored. This method makes use of trigonometric polynomials. The constraints on these polynomials are established, and an algorithm is presented for constructing any number of orthogonal waveforms. Examples are provided to demonstrate the use of both methods. (Author)

AD-623 778 **See Fld. 6/4**

AD-623 793 **See Fld. 9/3**

AD-623 910 **See Fld. 17/2**

AD-624 220 **See Fld. 9/3**

AD-624 225 **See Fld. 9/3**

9/5. SUBSYSTEMS

AD-623 728 Fld. 9/5, 17/4
CFSTI Prices: HC $1.00 MF $0.50
MICHIGAN UNIV ANN ARBOR RADIATION LAB
A SLOTTED CYLINDER WITH ZERO BACK SCATTERING.
Technical rept.,
by Kun-Mu Chen. Oct 65, 22p. Rept. no. tr-3
Contract AF33 (615)-1656 Proj. AF-5546 Task 554601
Unclassified report

Prepared in cooperation with Michigan State Univ., East Lansing.

Descriptors: (*Slot antennas, Backscattering), (*Radar deception, Slot antennas), Cylindrical bodies, Antenna radiation patterns, Electrical impedance, Optimization, Electric currents, Electric fields

It is shown that the back scattering of a thick cylinder can be eliminated by slotting the cylinder and backing the slot with an optimum impedance. An infinite cylinder with an impedance-backed longitudinal slot is assumed to be illuminated by a plane EM wave with a transverse electric field. The induced current and the scattered fields are studied. The optimum impedance which backs the longitudinal slot to achieve zero back scattering is explicitly obtained. This optimum impedance should prove useful in the practice of radar camouflage. (Author)

AD-623 779 Fld. 9/5
CFSTI Prices: HC $2.00 MF $0.50
CRUFT LAB HARVARD UNIV CAMBRIDGE MASS
COUPLED DIPOLES IN A DISSIPATIVE MEDIUM. PART I: THEORY. PART II. MEASUREMENTS.
Technical rept.,
by R. W. P. King, S. S. Sandler, and Keigo Lizuka.
20 Jul 65, 36p. Rept. no. tr-479
Contract Nonr-1866 (32) Proj. NR-371-016
Unclassified report

Descriptors: (*Dipole antennas, Coupled antennas), (*Coupled antennas, Dipole antennas), Antenna arrays, Electrical impedance, Admittance, Antenna radiation patterns, Electric currents, Electrical conductance, Resistance (Electrical)

The admittance and impedance of a two-element array when immersed in an arbitrary dissipative medium are determined from a generalization of the King-Sandler theory of arrays. Numerical results are given for half-wave and quarter-wave dipoles with two different thicknesses. The distance between the element is the independent variable. Experiments carried out in a tank filled with a conducting solution to determine the self and mutual admittances of coupled dipoles are described. The agreement between the measured values and the theory is quite good. (Author)

AD-623 853 Fld. 9/5, 17/9
CFSTI Prices: HC $2.00 MF $0.50
LITTON PRECISION PRODUCTS INC MORRIS PLAINS N J AIRTRON DIV
DUPLEXER FOR SIDE-LOOKING RADAR.
Quarterly rept. no. 3, 1 Jan-31 Mar 65,
by Morrell L. King, Donald A. Lepore, J. W. Nielsen, and E. Wantuch. 31 Mar 65, 30p. Rept. no. r11-482
Contract DA-28-043-AMC-00280 (E) Proj. DA-1P6-22001-A-055-04
Unclassified report

See also AD-617 568.

Descriptors: (*Radar duplexers, Side-looking radar), (*Side-looking radar, Radar duplexers), Limiters, Ferromagnetic materials, Ferrites, Yttrium compounds, Iron compounds, Garnet, Magnesium compounds, Manganese compounds, Nickel compounds, Cobalt compounds, Phase shifters, Waveguide circulators, X band, Microwave equipment, Waveguide switches

The results of the investigation of hot-pressed nickel ferrites is described along with the performance of these materials in the three-port circulator. Two sphere YIG limiter-filters have been designed and the high power performance is presented. Conventionally fired and hot-pressed ferrites are compared, as to performance in the phase shift section of a latching four-port switch. (Author)

AD-623 883 Fld. 9/5
CFSTI Prices: HC $1.00 MF $0.50
NAVAL ORDNANCE LAB CORONA CALIF
MICROWAVE ATTENUATORS AND TERMINATIONS, A SIMPLE TECHNIQUE FOR FABRICATION IN THE LABORATORY.
Technical rept.,
by Fred H. Camphausen,Jr.. 15 Oct 65, 9p.
NAVWEPS 8830

Unclassified report

Descriptors: (*Attenuators, Microwave equipment), (*Foams, Attenuation), Cutting, X band, Waveguides, Dielectric properties

Absorbing elements for X-band waveguide attenuators and terminations can be made successfully from flexible-foam absorbing material with the use of simple tools. Any insertion loss greater than 3 dB can be produced immediately by trimming the length of the element. In addition to providing design data, techniques are described for fabricating the fixed attenuators and terminations. These techniques avoid the complex machine cuts and close tolerances required when blocks or strips of rigid microwave-absorbing material are used. (Author)

AD-623 927 Fld. 9/5, 12/1
CFSTI Prices: HC $3.00 MF $0.75
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS MICROWAVE PHYSICS LAB
ASYMPTOTIC SOLUTIONS OF DIPOLES IN A SEMI-INFINITE MEDIUM,
Physical sciences research papers,
by Kondagunta U. Sivaprasad. Sep 65, 56p.
Rept. no. psrs-131
Proj. AF-4600 Task 4600-08
AFCRL 65-66

Unclassified report

Descriptors: (*Dipole antennas, Electromagnetic fields), (*Saddle point method, Electromagnetic fields), Field theory, Integrals, Asymptotic series, Antenna radiation patterns, Underground antennas, Fourier analysis

A theoretical analysis is made of the electromagnetic fields in two homogeneous media separated by a plane interface with a point source located in the denser medium. The solution is expressed in the form of integrals which cannot be evaluated explicitly. Asymptotic evaluations of the integrals have been made by many investigators using the saddle-point technique. In the present work, all known asymptotic results are presented in one comprehensive form, using a modification of the method suggested by Lighthill for the asymptotic evaluation of the Fourier integrals. The regions of validity of the solutions are indicated whereever possible. The advantage of this method over others is its ease and simplicity. The present results agree term by term with the earlier ones of Banos and Wesley (1953-1954), and Paul (1959), who investigated the case of a source and receiver close to the interface, and an arbitrary location of source and receiver, respectively. The results obtained in the report are also compared with those of Stein (1955). (Author)

AD-623 955 Fld. 9/5
CFSTI Prices: HC $3.00 MF $0.75
TEXAS INSTRUMENTS INC DALLAS SEMICONDUCTOR-COMPONENTS DIV
THIN FILMS FORMED BY ELECTROCHEMICAL REACTIONS.
Interim summary rept. no. 2, 1 Jun 64-31 May 65, by R. Scot Clark, and Coy D. Orr. Jun 65, 78p.
Rept. no. ti-03-65-71
Contract DA-36-039-AMC-02324 (E) Proj. DA-1C0-24401-A112-04

Unclassified report

Descriptors: (*Integrated circuits, Preparation), (*Films, Electrochemistry), (*Sputtering, Integrated circuits), (*Tantalum compounds, Sputtering), Oxides, Deposition, Resistance (Electrical), Resistors, Dielectric films, Capacitors, Radiofrequency amplifiers, Silicon, Transistors, Microelectronics, Intermediate frequency

Reactively sputtered thin films of tantalum oxide deposited onto thermally oxidized silicon offer a very wide range of sheet resistivities. The application of an external d-c bias to the substrate during sputtering alters sheet resistivity with no change in film thickness. Resistors of 237 ohms/sq changed less than 3% after 1000 hours at +125C and 2.5 watts/sq inch. Sputtering variables were investigated and optimized to improve resistor parameters. Reactively sputtered Ta2O5 dielectric films deposited onto aluminum electrodes offer capacitance values from 0.3 to 3.0 pF/sq. mil and d-c breakdown voltages of 60 to 6 volts, respectively. Capacitors tested for 1000 hours at +125C and 60% of destructive breakdown voltage changed less than 2% from initial capacitance. Substrate biasing during deposition can be used to improve the dielectric strength. Sputtering variables were investigated and optimized to improve capacitor parameters. A 455 kc amplifier is being used as a test vehicle for fabrication of a hybrid/monolithic circuit. The substrate is silicon with diffused transistors and thin film resistors and capacitors are deposited on the substrate. (Author)

AD-623 961 Fld. 9/5, 9/2
CFSTI Prices: HC $3.00 MF $0.75
HYDRAULIC RESEARCH AND MFG CO DIV OF BELL AEROSPACE CORP BURBANK CALIF
PARALLEL BINARY TORQUER FEASIBILITY STUDY.
Contract rept. on Study of a digital/analog mechanization for application in an electro-hydraulic servo valve,
by D. S. Seidel. Nov 65, 98p. Contract N-123 (60530)52063A Task RMWC-24-113/216-1/F009-04-04
NOTS TP-3913; ,NAVWEPS 8805

Unclassified report

Descriptors: (*Servomechanisms, Valves), (*Valves, Servomechanisms), Digital-to-analog converters, Torque, Selenoids, Electromagnets, Armatures, Preamplifiers

This document is a facsimile of a report describing a 'Parallel Binary Torquer' feasibility study conducted at HR and M under Contract NO. N-123 (60530)52063A. This 'parallel binary torquer' is a 'D/A' mechanization intended for application in an electro-hydraulic servo valve. The 'D/A' mechanization which converts a parallel binary work into a proportional analog torque is accomplished by mechanically summing binary weighted torque levels. The binary weighted torque levels are derived from individual solenoids operated in full magnetic saturation. The mechanical summation is the result of utilizing a common (single) armature assembly for all solenoids. Feasibility of this 'D/A' mechanization was demonstrated by constructing and evaluating a =3 bit parallel binary torquer breadboard driving standard Hydraulic Research and Manufacturing hydraulic preamplifier and power stages. Recommendations are made for a followon program continuing the Research and Development (R and D) effort initiated under this feasibility study. The followon Research and Development program, as recommended, would utilize the design and developmental techniques formulated during the feasibility study and would result in a =7 bit parallel binary servo valve experimental model. (Author)

AD-624 075 Fld. 9/5
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
THE STATE VARIABLE APPROACH TO NETWORK ANALYSIS.
Research rept.,
by E. S. Kuh, and R. A. Rohrer. 10 May 65, 22p.
Rept. no. ERL-65-12
Contract NSF-GP-2684 ,AF-AFOSR-139-63

Unclassified report

Availability: Published in Proceedings of IEEE V53 N7 P672-86 Jul 1965. Copies to DDC users only.

Descriptors: (*Electrical networks, Mathematical analysis), Equations, Matrix algebra, Time, Nonlinear systems

The universality of the state-variable approach to network analysis is demonstrated in general discussions and specific examples. The method of formulation of the state equations for an arbitrary lumped, linear, finite, reciprocal, passive, time-invariant network is presented fully, while the relaxation of these restrictions is indicated in detail; i.e., the state-variable characterization of active, nonreciprocal, time-variable, and nonlinear networks is discussed. Finally, there is a brief guide of the current research where the state-variable analysis is brought to bear upon certain qualitative aspects of classical and nonclassical network behavior. (Author)

AD-624 078 Fld. 9/5, 20/3
CFSTI Prices: HC $1.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
GENERALIZED TIME-SPACE PERIODIC MODULATION IN CYCLOTRON PARAMETRIC AMPLIFIERS.
Memo rept.,
by E. S. Cassedy. 4 Mar 63, 17p. Rept. no. PIB-MRI-1133-63 ,M-86
Contract AF-AFOSR-62-295 AFOSR 65-1720

Unclassified report

Descriptors: (*Parametric amplifiers, Cyclotron waves), (*Modulation, Parametric amplifiers), Traveling-wave tubes, Harmonic generators, Pumping (Electronics), Electron beams, Harmonic analysis, Cyclotrons

It is proposed to investigate the coupling of electron beam modes under the influence of parametric pumping fields. The effects of the complete set of time-space harmonics (idlers) are to be included in this study, as well as additional coupling mechanisms created by pump harmonics. A particular condition, called the 'synchronous harmonic condition', is predicted and proposed for theoretical and experimental study. None of the timespace harmonics may be neglected in this condition created by a traveling wave-quadrupole pumping field. This condition, fully explored, could be the basis for a new device: a 'synchronous (amplifying) harmonic generator'. A comprehensive study of parametric wave coupling in cyclotron devices is proposed with pump conditions ranging from D. C. (spatial periodicities only) to the adler type pump (time periodicity only) and various pump field configurations considered for the quantitative effects on amplification efficiency and extraneous coupling.

AD-624 096 Fld. 9/5, 20/5, 17/8
CFSTI Prices: HC $3.00 MF $0.75
ARMY ELECTRONICS COMMAND FORT MONMOUTH NJ
DESIGN OF 15-MC MICROELECTRONIC COUNTER FOR THE LASER RANGE FINDER.
Technical rept.,
by George A. Hrivnak. Dec 64, 69p. Rept. no. ecom-2543
Proj. DA-1L0-13001-A-91 Task 1L0-13001-A-91-A-16

Unclassified report

Descriptors: (*Lasers, Range finding), (*Range finding, Lasers), (*Time-interval counters, Range finding), Light transmission, Velocity, Measurement, Silicon, Integrated circuits, Microminiaturization (Electronics), Modules (Electronic), Experimental design, High frequency

This report covers the design, fabrication and evaluation of a 15-Mc microelectronic Laser Range Counter which was undertaken on a Laboratory Director's In-House Program. The model which was developed measures only 1 1/4 in x 3 1/4 in x 5 in and weighs only 13 oz. It employs silicon integrated circuits, 'chip and wire circuits' and Micro-Modules. It is completely maintainable, and provides full performance over the temperature range of +150F to -40F. The microelectronic Laser Range Counter is operationally equivalent to the counter employed in the XE-6 Laser Range Finder. A 66% size reduction and a 75% weight reduction were achieved. (Author)

AD-624 098 Fld. 9/5
CFSTI Prices: HC $3.00 MF $0.75
ELECTRONIC DEFENSE LABS SYLVANIA ELECTRONIC SYSTEMS-WEST MOUNTAIN VIEW CALIF
THREE-AXIS FIBERGLASS PEDESTAL.
Technical memo.,
by Menahem Suliteanu, and Frederick M. Fonda,Jr.. 1 Jun 65, 97p. Rept. no. edl-M787
Contract DA-36-039-AMC-03404 (E) ,DA-28-043-AMC-00379 (E)
Unclassified report

Descriptors: (*Gimbals, Antennas), (*Glass textiles, Gimbals), Drives, Seromechanisms, Weight, Airborne, Shipborne, Friction, Control systems, Antenna components, Reinforcing materials, Expanded plastics, Reflectors, Suspension devices, Supports, Performance (Engineering)

The objective of this project was to develop, build and test a high-performance, lightweight, three-axis pedestal using a design concept that would allow applications ranging from small, very lightweight airborne, through medium-size shipboard, to large ground-based antennas. For systems requiring only a two-axis pedestal, the design had to have the capability of eliminating the third-axis motion with minimum redesign. This report includes a description of the design approach, design solution, and the details of a prototype to be built and used with a 10foot diameter reflector, the design, fabrication , and test of a full-scale, instrumented friction drive mock-up, and fabrication techniques development. A servo-control system for the friction drive was developed and tested with the full-scale mock-up. Results indicate very good performance of the friction drive. Design and experimental data indicate also that the light weight goal will be met. (Author)

AD-624 100 Fld. 9/5, 17/2
CFSTI Prices: HC $4.00 MF $1.00
ITT KELLOG COMMUNICATIONS SYSTEMS CHICAGO ILL
FEASIBILITY MODEL DEVELOPMENT DROP AND INSERT EQUIPMENT FOR MULTIPLEX.
Final technical rept., May 64-Feb 65,
by Joseph F. Doyle, and Foster W. Frazee. Oct 65, 146p. Contract AF30 (602)-3429 RADC TR-65-220
Unclassified report

Descriptors: (*Multiplex, Single sideband communication systems), (*Telephone communication systems, Multiplex), (*Single sideband communication systems, Multiplex), Frequency dividers, Band-pass filters, Phase control devices, Modulation, Demodulation, Very low frequency, Low frequency, Microminiaturization (Electronics), Packaged circuits

The principal aim of the work described herein was the development and construction of a practicable single channel Drop and Insert Multiplex System having a twelvechannel selection capability in the 'B' group from 60KC to 108KC. Secondary aims were analytical verification of design feasibility as applied to 'A' group frequencies from 12KC to 60KC and investigation of state-of-the-art miniaturization techniques in circuitry and packaging. A singlestep modulation and demodulation plan was used with band stop - band pass filters operating at group channel frequencies. Identical phase and amplitude equalizers were installed in the drop circuitry and in the insert path. Outofband signalling facilities were included. Engineering feasibility model consisted of a relay rack mounted, externally powered, full duplex common equipment unit (voice frequency and signalling circuitry) with 12 sets of plug-in band stop - band pass filter and carrier oscillator subassemblies. Final system tests indicated some improvement is desirable in pass band ripple, particularly in the higher frequency channels. Crosstalk, carrier suppression, distortion and other transmission characteristics were satisfactory. (Author)

AD-624 132 Fld. 9/5, 20/6, 9/2
CFSTI Prices: HC $3.00 MF $0.75
COLUMBIA UNIV NEW YORK ELECTRONICS RESEARCH LABS
ELECTRO-OPTICAL SIGNAL PROCESSING TECHNIQUES FOR PHASED ARRAY ANTENNAS.
Quarterly progress rept. 1 Apr-30 Jun 65,
by L. Lambert. 1 Jul 65, 63p. Rept. no. R-3/321, CU-13-AF-1478-ERL
Contract AF49 (638)-1478 ,ARPA Order-279
Unclassified report

See also AD-613 622.

Descriptors: (*Antenna arrays, Data processing systems), (*Data processing systems, Electrooptics), (*Electrooptics, Data processing systems), Integrators, Information theory, Multiplex, Simulators, Transducers, Lasers, Antenna apertures, Response

The research program for the development of electrooptical signal processing techniques applicable to phased array antenna systems is continued. A brief analysis of the planar array processor formed by combining the 'spatially multiplexed' and 'time-delay multiplexed' linear array processor techniques is presented. A description of the experimental system and the results obtained when processing signals simulating the output from a uniformly weighted planar array of 576 elements is included. The output response is very nearly ideal for signals on and off the boresight axis. The experimental results obtained with a spatial filter system at the laser output beam, and the frequency response of the multiple transducer are included. The theory and techniques developed for aperture weighting in the time-delay multiplex signal simulator are discussed. (Author)

AD-624 224 Fld. 9/5
CFSTI Prices: HC $1.00 MF $0.50
NEW YORK UNIV N Y SCHOOL OF ENGINEERING AND SCIENCE
PULSE GENERATORS,
by Michael Greenstein. Dec 63, 16p. Rept. no. sete-210/71
Contract NObsr-89288 Proj. SETE
Unclassified report

Descriptors: (*Pulse generators, Catalogs), Specifications, Costs

AD-623 718 **See Fld. 20/9**

AD-623 793 **See Fld. 9/3**

AD-623 802 **See Fld. 20/7**

AD-623 807 **See Fld. 20/5**

AD-623 989 **See Fld. 9/3**

AD-624 018 **See Fld. 9/1**

AD-624 080 **See Fld. 20/14**

AD-624 115 **See Fld. 9/1**

AD-624 166 **See Fld. 17/3**

AD-624 182 **See Fld. 12/1**

9/6. TELEMETRY

AD-623 969 **See Fld. 6/2**

10/1. CONVERSION TECHNIQUES

AD-623 730 Fld. 10/1, 11/6, 13/8
CFSTI Prices: HC $1.00 MF $0.50
WHIRLPOOL CORP ST JOSEPH MICH RESEARCH AND ENGINEERING LABS
THERMOELECTRIC JUNCTIONING PROJECT.
Progress rept. no. 3, 1 Oct-31 Dec 62,
by R. G. Sickert. 31 Jan 63, 17p. Contract NObs-86483 Proj. SR-007-12-01 Task 806
Unclassified report

See also AD-405 620.

Descriptors: (*Thermoelectricity, Materials), (*Soldering alloys, Microstructure), Films, Electrodeposition, Sputtering, Soldered joints, Eutectics, Reaction kinetics, Bismuth alloys, Tellurium alloys, Antimony alloys, Tin alloys, Copper, Melting point

Work on surface film analysis has progressed to the point where the cathodic etch process is controllable and films of 50 to 100 angstroms thickness can be deposited. A gold reference standard was developed, however, a superior platinum standard is now in process of evaluation. Partial identification of constituents of the sputtered films was accomplished. Melting point determination of solders was made and a near ternary eutectic solder of bismuth, antimony and tin was produced and evaluated. Examination of microstructures of solders and solder joints is in process. Studies of reaction rates between bismuth telluride, solder and copper were initiated. Diffusion layers produced in joining with the ternary eutectic solder were shown after long exposure at 450F. Ultrasonic tinning of bismuth telluride was not successful. (Author)

AD-623 763 Fld. 10/1
CFSTI Prices: HC $3.00 MF $0.75
GENERAL INSTRUMENT CORP NEWARK NJ THERMOELECTRIC DIV
FABRICATION TECHNIQUE DEVELOPMENT IN - LINE THERMOELECTRIC GENERATOR MODULES.
Final rept.,
by R. E. Rush. 1 Mar 63, 70p. Contract NObs-86538 Proj. SF-013-06-01 Task 2082
Unclassified report

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Thermoelectricity, Generators), (*Thermocouples, Modules (Electronic)), Semiconductor, Encapsulation, Heat transfer, Lead alloys, Telurium alloys, Bonding, Seebeck effect, Corrosion inhibition, Energy conversion, Doping, Performance (Engineering)

Three basic areas of thermoelectric generator technology were investigated in the first phase of this program; bonding of positive polarity lead telluride, encapsulation of lead telluride and the heat transfer problems related to an 'in-line' module. Bonding studies of 'P' PbTe thermoelements indicated that further development effort is required to obtain a method giving low junction resistance and not causing stress induced cracking of the ther-

moelement. Of the methods studied the only promising results were with 'Metallic Rich' Lead Telluride which, while stress induced thermoelement cracking was not observed, suffered a serious decrease in Seebeck coefficient as a function of operating time. If this problem could be overcome then this material could provide useful 'P' thermoelements. The very limited development effort devoted to encapsulation demonstrated that the glass bonded synthetic mica/cement end seal encapsulant, while satisfactory in an inert atmosphere, did not provide thermoelement oxidation protection.

10/2. POWER SOURCES

AD-623 788 Fld. 10/2, 20/9
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS SPACE PHYSICS LAB
ELECTROPHORETIC POWER GENERATION IN THERMALLY IONIZED PLASMAS.
Physical sciences research papers,
by C. C. Leiby,Jr., and J. C. Fields. Oct 65, 38p.
Rept. no. psrp-151
Proj. AF-8659 Task 865902
AFCRL 65-73
Unclassified report

Descriptors: (*Plasma medium, Energy conversion), (*Electrophoresis, Energy conversion), (*Electric power production, Plasma generators), (*Plasma generators, Electrophoresis), Gas discharges, Gas ionization, Gas flow, Cesium, Nonlinear differential equations, Pipes, Temperature, Pressure, Space charges

Druyvesteyn's solutions for electrophoretically induced gas flows in electrical discharges in gases were extended over a larger pressure range and corrected for the influence of Debye shielding effects. The effects of molecular or 'slip' flow were also taken into account. These more accurate and general solutions were applied to the reverse phenomenon of space charge field generation arising from the flow of a thermally ionized cesium plasma through a tube. Under such flow conditions, a nonlinear differential equation for the axial pressure distribution was obtained but not solved. However, it was possible to obtain estimates of the ranges of cesium pressure, temperature and tube radii which would be required for sensible levels of electric power generation. Anaphoretic flow power levels of the order of 0.1 to 10 watts, in tubes of laboratory dimensions (radii of 10 cm or less), appear feasible at temperatures from 1700 to 2400K. Sensible power generation levels at lower temperatures require very large diameter tubes, and therefore are not feasible. (Author)

AD-623 979 Fld. 10/2
CFSTI Prices: HC $1.00 MF $0.50
RENSSELAER POLYTECHNIC INST TROY N Y DEPT OF CHEMISTRY
BEHAVIOR OF THE CARBON ELECTRODE IN MOLTEN CARBONATES.
Technical rept.,
by M. D. Ingram, and G. J. Janz. Nov 65, 13p.
Rept. no. tr-27
Contract Nonr-591 (10) Proj. RPI-441.35
Unclassified report

Descriptors: (*Fuel cells, Electrodes), (*Carbon, Fuel cells), (*Electrodes, Fuel cells), Alkali metal compounds, Carbonates, Liquids, High-temperature research, Electrodeposition, Electrolytes, Doping

The reversibility of various carbons as electrodes in the ternary carbonate eutectic have been compared. The rest-potential of electrodeposited carbon (-2.2V versus the Danner-Rey electrode) depends on the presence of occluded oxide. The simulation and use of this carbon in a high temperature fuel cell is discussed. (Author)

AD-624 158 Fld. 10/2
CFSTI Prices: HC $1.00 MF $0.50
ALLIS-CHALMERS MFG CO MILWAUKEE WIS SPACE AND DEFENSE SCIENCES DEPT
DESIGN OF HYDROGEN-OXYGEN CAPILLARY TYPE FUEL CELL.
Quarterly progress rept. no. 8, 1 Aug-31 Oct 65,
by L. S. Harootyan,Jr.. 15 Nov 65, 25p. Contract AF33 (615)-1185
Unclassified report

See also AD-619 158.

Descriptors: (*Fuel cells, Design), Spaceborne, Temperature control, Electrodes, Oxygen, Hydrogen, Capillary tubes, Solenoids, Pressure regulators, Vacuum apparatus, Flight testing

The design of the 1965 modules is complete and improvements were made in the thermal control system and the cell plate design. Advance design studies are in progress. Design verification tests of components are also underway. The orbital fuel cell experiment was attempted, but a vehicle course deviation necessitated its destruction. (Author)

AD-624 216 Fld. 10/2, 13/10
CFSTI Prices: HC $1.00 MF $0.50
WESTINGHOUSE ELECTRIC CORP LIMA OHIO AEROSPACE ELECTRICAL DIV
100 WATT THERMOELECTRIC POWER SYSTEM FOR BUOY APPLICATIONS.
Monthly progress rept. no. 17, 11 Oct-11 Nov 65,
by Dale A. Naumer. 11 Nov 65, 5p. Contract N600 (61533)61992 Proj. PR-161-7026-64
Unclassified report

Descriptors: (*Thermoelectricity, Buoys), (*Buoys, Thermoelectricity), Electric power production, Generators, Marker lights, Thermocouples, Germanium alloys, Bismuth alloys, Tellurium alloys, Lead alloys, Energy conversion, Tests

The first 100 watt thermoelectric generator for the U. S. Navy Marine Engineering Laboratory has been assembled. The enclosure in which the thermoelectric modules are placed is being checked to insure leak free construction. Verification of the hermetic seal is being accomplished by using a helium mass spectrometer technique. A vacuum of 10 to the minus 5th power torr is applied to the container and a blanket of helium gas applied to all joints and seals. If a flaw exists, the helium will enter and be recorded on the mass spectrometer. While in operation, the generator will contain an inert atmosphere and this method of leak testing will insure containment for the full period of operation.

11/2. CERAMICS, REFRACTORIES, AND GLASSES

AD-623 887 Fld. 11/2, 20/2
CFSTI Prices: HC $3.00 MF $0.75
HONEYWELL RESEARCH CENTER HOPKINS MINN
BASIC MECHANISMS OF STRAIN HARDENING IN CERAMICS.
Technical rept.,
by R. J. Stokes. Oct 65, 64p. Rept. no. hr-65-274 ,TR-32
Contract Nonr-4076 (00) Proj. NR-032-451
Unclassified report

Presented at Sagamore Army Materials Research Conference on Strengthening Mechanisms in Metals and Ceramics (12th), Sagamore, N. Y. 1965.

Descriptors: (*Ceramic materials, Strain hardening), (*Strain hardening, Ceramic materials), Crystal lattice defects, Rock salt, Crystal structure, Lithium compounds, Fluorides, Magnesium compounds, Oxides, Single crystals

The paper deals with fundamental studies of strain hardening in rock salt structure ceramics. Strain hardening at low temperatures is primarily associated with dislocation interactions within single slip bands. As the slip band structure varies so the mechanism controlling strain hardening changes. It may involve dislocation dislocation interaction (Taylor hardening), dislocation dipole interaction, or dislocation - prismatic loop interaction depending on the particular material and test temperature. Strain hardening at intermediate temperatures is associated with multiple slip. Conjugate slip is much less effective in hardening a crystal than oblique slip, principally because dislocations with oblique Burgers vectors react to form sessile dislocations. Strain hardening due to conjugate slip completely disappears at high temperatures and crystals deforming by this mode become plastically unstable. Strain hardening due to oblique slip never disappears. At high temperatures, the dislocation reaction generates stable dislocation networks which constitute the major barrier to dislocation movement. (Author)

11/3. COATINGS, COLORANTS, AND FINISHES

AD-623 992 Fld. 11/3, 13/8
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
AN INVESTIGATION OF BARRIER COATINGS ON GRAPHITE MOLDS FOR CASTING TITANIUM.
Final rept.,
by W. A. Reaves, and E. J. Chapin. 13 Oct 65, 43p. Rept. no. nrl-6295
Proj. RR-007-01-46-5419 ,RR-011-03-41-6068
Unclassified report

Descriptors: (*Coatings, Molding), (*Molding, Coatings), (*Titanium, Casting), Graphite, Oxides, Magnesium compounds, Zirconium compounds, Calcium compounds, Zirconates, Gadolinium compounds, Yttrium compounds, Impurities, Protective treatments, Flame spraying

The coatings included: a solid solution of MgO and ZrO2; a true oxide compound, CaZrO3; and two single oxides, Gd2O3 and Y2O3. The compound oxides were applied to specially cleaned ATJ grade graphite-mold hollowcylinder inserts by an oxy-acetylene flame spray method, and the single oxides were applied in similar inserts by a plasma spray technique. The MgO, ZrO3 and CaZrO3 coatings were considered to be insufficiently resistant under casting conditions to qualify as satisfactory barrier coatings. The rare earth oxide Gd2O3 was found to be resistant to molten titanium during casting and to provide a good barrier between the graphite mold substrate and the cast metal, with no significant increases in either oxygen or carbon content. The oxide Y2O3 was found to have the best characteristics as a barrier coating. This oxide did not appear to be wetted by the molten metal cast against it nor to introduce any significant amounts of contaminants into the case metal. The barrier coatings were not effective in altering the high heat extraction capability of the graphite substrate and thus did not provide any improvement in solidification center line shrinkage. (Author)

11/4. COMPOSITE MATERIALS

AD-623 947 Fld. 11/4, de/p .
CFSTI Prices: HC $3.00 MF $0.75
AEROJET-GENERAL CORP AZUSA CALIF
DETERMINATION OF EFFECTS OF MATERIALS AND PROCESS VARIABLES ON FILAMENT-WOUND STRUCTURES.
Final rept.,
by F. J. Darms, and T. R. Sakakura. Oct 65, 82p.
Rept. no. 3094 (Final)

Contract N140 (131)-75687B (X) Proj. BuShips-SF-012-01-03 Task 217

Unclassified report

See also AD-605 572.

Descriptors: (*Filament wound construction, Composite materials), (*Composite materials, Filament wound construction), Pressure vessels, Loading (Mechanics), Manufacturing methods, Performance (Engineering), Structural properties, Deep submergence, Submarine hulls, Glass textiles, Reinforcing materials, Plastics, Winding, Failure (Mechanics), Fatigue (Mechanics), Creep strength, Hydrostatic pressure, Tests, Defects (Materials)

The effects of material and process variables on the fabrication and performance of biaxially loaded filament-wound external pressure vessels were investigated. Methods of establishing a standard test specimen were applied. Performance effects resulting from variations in material properties (e.g., resin content and viscosity index), processing parameters (e.g., tension, cure cycle, and overwrap pressure), and intentionally introduced manufacturing defects (e.g., interlaminar voids and gaps in hoop windings) were determined. Static, creep, and cyclic pressure tests were performed, and the interrelationships of voids, ultrasonic-absorption attenuation, interlaminar shear strength, and ultimate strength were analyzed. (Author)

11/5. FIBERS AND TEXTILES

AD-623 879 Fld. 11/5, 13/8, 19/4
CFSTI Prices: HC $2.00 MF $0.50
UNITED STATES RUBBER CO WAYNE N J RESEARCH CENTER
RESEARCH AND DEVELOPMENT OF HIGH TENACITY FIBERS. PART I. POLYOLEFINS.
Quarterly progress rept. no. 4, 1 Jan-1 May 63, by H. P. Kato, and A. W. Stoner. 24 Jun 63, 26p. Contract Nonr-3767 (00) (X)

Unclassified report

See also AD-623 888.

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Polyethylene plastics, Spinning), (*Fibers (Synthetic), Polyethyylene plastics), Tensile properties, Drawing (Machine processing), Body armor

In repeated diagnostic spinning of Profax 6823 to achieve a marginal improvement in strength, a higher strength of 13.5 gpd was realized. The elongations of these high strength samples from Profax 6823 have been of the order of 18% as compared to 12% for fibers from Profax 6523. The moduli of ttttttthe former fibers, on the other hand, have been observed to be lower. The investigation was not completely successful in realizing greater than 12 gpd in the three pound yarn sample. A lower tenacity of 10 gpd was accepted. The difficulties inherent in spinnings and drawings of long duration were new and a number of explanations and remedies are offered. The high strength capabilities of polypropylene have been well established and further scale up efforts should be fruitful. (Author)

AD-623 880 Fld. 11/5, 13/8
CFSTI Prices: HC $1.00 MF $0.50
UNITED STATES RUBBER CO WAYNE N J RESEARCH CENTER
RESEARCH AND DEVELOPMENT OF HIGH TENACITY FIBERS POLYOLEFINS.
Quarterly progress rept. no. 5, 1 Aug-31 Oct 63, by H. P. Kato, and J. S. Lasky. 11 Nov 63, 16p. Contract Nonr-3767 (00) (X)

Unclassified report

See also AD-623 893.

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Polyethylene plastics, Spinning), (*Fibers (Synthetic), Polyethylene plastics), Tensile properties, Manufacturing methods, Extrusion, Temperature control, Filaments, Dies

An improved thermal jacket enclosing the upper portion of the spinning way with multipoint temperature control and recording probes has been designed and built. The first tests have been successful and the possibility of a wide latitude in the control of orientation fixed in the fiber and in extending the rates of spinning has been demonstrated. A series of parallel spinnings with various L/D dies have demonstrated the desirability of using higher L/D dies for reducing filament to filament strength fluctuations in the finished yarn. SRI's spinning conditions for high strength have been duplicated within reasonable limits and it is concluded that their specifications are not amendable to producing yarns of adequate uniformity in denier. Furthermore the filaments as spun are not of the 'smectic' or 'paracrystalline' state as suggested by their argument but are crystallized and oriented. (Author)

AD-623 888 Fld. 11/5, 13/8, 19/4
CFSTI Prices: HC $1.00 MF $0.50
UNITED STATES RUBBER CO WAYNE N J RESEARCH CENTER
RESEARCH AND DEVELOPMENT OF HIGH TENACITY FIBERS. PART I. POLYOLEFINS.
Quarterly progress rept. no. 1, 1 Mar-30 May 62, by A. W. Stoner, and H. P. Kato. 20 Jun 62, 18p. Contract Nonr-3767 (00) (X)

Unclassified report

See also AD-623 879.

Descriptors: (*Polyethylene plastics, Spinning), (*Fibers (Synthetic), Polyethylene plastics), Tensile properties, Molecular weight, Drawing (Machine processing), Body armor

Efforts to achieve high tenacity polyolefin fibers of 12 g.p.d. or greater have thus far been directed along two lines; namely, exploratory spinning and creep drawing of quenched fibers. Work thus far covers one type of polypropylene only, Profax 6523. Using conventional spinning scheme it was demonstrated that drawn fibers yielding 9 g.p.d. (100%/min strain rate) may be systematically realized. A relationship between total orientation and tenacity has been observed which will form the main basis for further development work. Experiments with a jacketed spinning way appears to give highly uniform denier at lower polymer temperatures. This should facilitate the spinning of higher molecular weight polymer for evaluation. A second line of research has been to creep draw quenched fibers in order to see what strengths could be developed by this method. Thus far 8 g.p.d. has been the highest tenacity produced. (Author)

AD-623 889 Fld. 11/5, 13/8, 19/4
CFSTI Prices: HC $1.00 MF $0.50
UNITED STATES RUBBER CO WAYNE N J RESEARCH CENTER
RESEARCH AND DEVELOPMENT OF HIGH TENACITY FIBERS. PART II. POLYAMIDES.
Quarterly progress rept. no. 1, 15 Jun-15 Sep 62, by C. F. Fisk, and W. Pochmursky. 10 Oct 62, 23p. Contract Nonr-3767 (00) (X)

Unclassified report

See also AD-623 891.

Descriptors: (*Nylon, Spinning), (*Fibers (Synthetic), Polyamide plastics), Tensile properties, Drawing (Machine processing), Filaments, Extrusion, Body armor

Nylon 6 monofilaments were spun and oriented to yield a tenacity as high as 9.0 grams per denier. Single-step drawing at 350F gave as good results as were obtained by a two step process of cold-drawing followed by hotdrawing. Multifilament yarns were spun and drawn from the high molecular weight nylon 6 resin Plaskon 8205. The yarns showed considerable nonuniformity and the maximum yarn tenacity obtained was only 6.7 g/d although individual filaments had 8.2 g/d tenacity. The percent crystallinity by X-ray was found to increase after hot drawing, but the amount of crystallinity was not closely related to the tenacity obtained. The amount of polymer breakdown during spinning at 500F was found to be small and relatively unimportant. The tenacity for nylon 6 yarn was relatively unaffected by changing the testing rate at room temperature from 100% per minute to 20% per minute. An attachment has been designed and is being built which will permit spinning nylon 6 through a metering gear pump instead of spinning with extruder screw pressure along as is being done at present. (Author)

AD-623 890 Fld. 11/5, 19/4, de/p .
CFSTI Prices: HC $1.00 MF $0.50
UNITED STATES RUBBER CO WAYNE N J RESEARCH CENTER
RESEARCH AND DEVELOPMENT OF HIGH TENACITY FIBERS. PART III. DETERMINATION OF IMPORTANT PHYSICAL PROPERTIES OF FIBERS FOR BALLISTIC ARMOUR.
Quarterly progress rept. no. 1, 15 Jun-15 Sep 62, by E. M. McColm, J. P. Heckl, and A. W. Stoner. 16 Oct 62, 7p. Contract Nonr-3767 (00) (X)

Unclassified report

Descriptors: (*Body armor, Textiles), (*Fibers (Synthetic), Physical properties), Tensile properties, Test equipment, Test methods, Glass textiles, Polyethylene plastics

The purpose of this project is to search for the physical properties of a fiber which are important in determining its ability to resist penetration by a metallic fragment when woven into ballistic armour. Presumably if these properties were known, fibers could be tailored to give maximum resistance. The fibers to be investigated are nylon, dacron, glass fibers, rayon, orlon, kuralon, polypropylene and polyethylene.

AD-623 891 Fld. 11/5, 13/8
CFSTI Prices: HC $1.00 MF $0.50
UNITED STATES RUBBER CO WAYNE N J RESEARCH CENTER
RESEARCH AND DEVELOPMENT OF HIGH TENACITY FIBERS. PART II. POLYAMIDES.
Quarterly progress rept. no. 3, 15 Oct 62-15 Mar 63,
by C. F. Fisk, and W. Pochmursky. 21 Mar 63, 24p. Contract Nonr-3767 (00) (X)

Unclassified report

See also AD-623 889.

Descriptors: (*Nylon, Spinning), (*Fibers (Synthetic), Polyamide plastics), Tensile properties, Drawing (Machine processing), Extrusion, Body armor

The objective of this project is to develop a high tenacity nylon 6 yarn with a strength of 12 grams per denier for use in body armor applications. Work has been continued with the same normal molecular weight Plaskon 8201 resin, but a number of changes in equipment and procedure have been made. As a result small samples of nylon 6 multifilament yarn have been spun and drawn which have tenacities substantially higher than previously obtained.

AD-623 892 Fld. 11/5, 13/8
CFSTI Prices: HC $2.00 MF $0.50
UNITED STATES RUBBER CO WAYNE N J RESEARCH CENTER
RESEARCH AND DEVELOPMENT OF HIGH TENACITY FIBERS. PART I. POLYOLEFINS.
Quarterly progress rept. no. 2, 1 Jun-31 Aug 62, by H. P. Kato, and A. W. Stoner. 4 Oct 62, 34p. Contract Nonr-3767 (00) (X)

Unclassified report

See also AD-623 880.

Descriptors: (*Polyethylene plastics, *Spinning), (*Fibers (Synthetic), Polyethylene plastics), Manufacturing methods, Tensile properties, Extrusion, Filaments, Molecular weight, Temperature

Continued efforts with Profax 6523 have resulted in fibers with a tenacity of 11.5 gpd and an elongation at break in the neighborhood of 15%. Spinning has been extended to the higher and lower molecular weight polypropylenes. Higher molecular weights are expected to give higher strengths experiments to date have not been of a caliber to support this hypothesis. The development of tenacity from the drawing operation has been explored over a wide range of temperatures both for polypropylene and for polyethylene. Reasonably optimum conditions have been established for both cases. Multifilament polyethylene was spun from Marlex 6002, 6009, and 6050. The maximum fiber tenacity developed by a two step drawing operation was 11.1 gpd. The higher molecular weight Marlex's gave higher tenacities. (Author)

AD-623 893 Fld. 11/5, 13/8
CFSTI Prices: HC $1.00 MF $0.50
UNITED STATES RUBBER CO WAYNE N J RESEARCH CENTER
RESEARCH AND DEVELOPMENT OF HIGH TENACITY FIBERS POLYOLEFINS.
Quarterly progress rept. no. 6, 1 Nov 63-31 Jan 64,
by H. P. Kato, and J. S. Lasky. 7 Feb 64, 16p.
Contract Nonr-3767 (00) (X)
Unclassified report

See also AD-605 222.

Descriptors: (*Polyethylene plastics, Spinning), (*Fibers (Synthetic), Polyethylene plastics), Manufacturing methods, Tensile properties, Filaments, Viscosity, Surface properties, Roughness, Velocity, Temperature control, Dies, Extrusion

The conversion of our spinning four filaments to eight filaments was achieved without complications and a top spinning speed of 500 ft/min has been reached. An improvement in the intrinsic viscosity of the spun filaments has been realized through the practice of blanketing the molten filaments within the thermal jacket with nitrogen. The breaking elongations are noticeably improved, perhaps by a factor of one-third. The tenacities have been maintained and are reasonably high. The development of Profax 6823 fiber strength increases with an increasing amount of orientation fixed during spinning, a justifiable reversal of an earlier observation. This finding lessens in part the need for achieving spinning speeds beyond our already realized current levels. A surface roughness effect was observed this quarter which appears to be limiting further improvements both in spinning speed and in the attainment of higher strength. The problem remains to be explored. (Author)

11/6. METALLURGY AND METALLOGRAPHY

AD-623 710 Fld. 11/6
WASHINGTON UNIV SEATTLE COLL OF ENGINEERING
ELEVATED TEMPERATURE METALLOGRAPHIC FACILITY FOR DEFORMATION AND FRACTURE STUDIES.
Technical rept.,
by M. B. Kasen, P. W. Ford, R. Taggart, and D. H.Polonis. 23 Feb 65, 6p. Rept. no. tr-1
Contract Nonr-477 (40) Proj. NR036 061
Unclassified report

Availability: Published in Review of Scientific Instruments V36 N6 P838-42 Jun 1965. Copies to DDC users only.

Descriptors: (*Metallography, Instrumentation), (*Deformation, Metallography), (*Fracture (Mechanics), Metallography), Microstructure, Surface properties, High-temperature research, Controlled atmospheres, Loading (Mechanics), Strain (Mechanics), Microscopes, Temperature control

A metallograph was constructed so as to permit the microstructural examination of the surface of metallurgical specimens during deformation and fracture at elevated temperature in a controlled environment. Auxiliary instrumentation provides for the recording of specimen elongation, load, load transients, and temperature on a time base. The rate of specimen elongation may be controlled independently of the load. Microstrain can be measured from the relative displacement of surface markings at the same time as the microstructural appearance is observed and photographed. Cine photography can be employed to record deformation or fracture sequences. In all circumstances a careful correlation is maintained between all the measured parameters. (Author)

AD-623 844 Fld. 11/6, 20/2
CFSTI Prices: HC $5.00 MF $1.00
CARNEGIE INST OF TECH PITTSBURGH PA DEPT OF METALLURGICAL ENGINEERING
EFFECT OF ELASTIC AND PLASTIC DEFORMATION ON THE MARTENSITE TRANSFORMATION IN 25% NI MARAGING-ALLOY SINGLE CRYSTALS.
Final technical rept.,
by J. D. Defilippi, and H. W. Paxton. 1 Nov 65, 188p. Contract Nonr-760 (14) Proj. NR-031-707
Unclassified report

Doctoral thesis.

Descriptors: (*Deformation, Maraging steels), (*Maraging steels, Single crystals), (*Single crystals, Deformation), (*Transformations, Maraging steels), Nickel alloys, Martensite, Strain (Mechanics), Transition temperature, Stresses, Metallography

The effect of the magnitude and temperature of elastic and plastic deformation prior to transformation on the burst transformation characteristics of a 25% Ni maraging alloy was determined systematically. Uniaxial tensile strain equal to or less than the Luders' strain caused an 8 to 12C rise in the burst temperature, M sub b, of single crystals of various orientations that were strained at 0C, 20C, 120C, or 220C prior to transformation. When the prior plastic strain exceeded the Luders' strain, a 2 to 3C decrease in M sub b was observed for each 0.1 increment of glide strain in excess of the Luders' strain, and the amount of transformation product formed at M sub b was observed to decrease linearly with increasing plastic strain. In deformed single crystals the majority of the martensite plates formed along four (259) habit plane variants that grouped about a <110> direction that was 35.3 degrees from both the pole of the primary and the conjugate slip planes and 60 degrees from the primary slip direction. In single crystals transformed under an elastic compressive load, a decrease in M sub b was observed. The thickness of the crystal increased if the elastic compressive stress was less than 3 Kg./sq mm. and decreased if the stress was greater than 3 Kg./sq mm.

AD-624 017 Fld. 11/6
CFSTI Prices: HC $2.00 MF $0.50
RENSSELAER POLYTECHNIC INST TROY N Y CORROSION RESEARCH LAB
PREDICTING THE INTERGRANULAR CORROSION OF AUSTENITIC STAINLESS STEELS.
Technical rept.,
by W. D. France,Jr., and N. D. Greene. Oct 65, 29p. Rept. no. tr-3
Contract Nonr-591 (17)
Unclassified report

Presented at NACE Conference (21st), St. Louis, Mo., 15-19 Mar 65.

Descriptors: (*Stainless steel, Corrosion), (*Corrosion, Stainless steel), Austenite, Chromium alloys, Nickel alloys, Grain structures (Metallurgy), Corrosive liquids, Sulfuric acid, Voltage

The precise environmental conditions necessary for the intergranular corrosion of austenitic stainless steels have been determined by potentiostatic methods. Intergranular corrosion of sensitized 18Cr - 8Ni stainless steel only occurs in limited potential regions. These results have been used to develop a new method for rapidly predicting the intergranular corrosion tendencies of various sulfuric acid environments. It is also shown that sensitized stainless steels may be used in many media without the occurrence of intergranular attack. (Author)

AD-624 032 Fld. 11/6
CARNEGIE INST OF TECH PITTSBURGH PA DEPT OF METALLURGICAL ENGINEERING
SURFACE- (INTERFACE-) AND VOLUME-DIFFUSION CONTRIBUTIONS TO MORPHOLOGICAL CHANGES DRIVEN BY CAPILLARITY,
by F. A. Nichols, and W. W. Mullins. 5 Apr 65, 9p. Contract DA-31-124-ARO (D)-190 AROD 4838:2
Unclassified report

Availability: Published in Transactions of the Metallurgical Society of Aime V233 P1840-8 Oct 1965. Copies to DDC users only.

Descriptors: (*Diffusion, Perturbation theory), (*Sintering, Diffusion), Alpha bombardment, Metals, Copper, Field emission

Solutions are developed, assuming surface diffusion and both internal and external volume diffusion, for the relaxation of bodies slightly perturbed from spherical and cylindrical geometries. Combined with those previously published for the nearly planar case, these results provide a means of gaging the relative contributions of the two diffusional proccesses in any given case. It is shown that in all sintering experiments to date, and probably in any attainable in practice, surface diffusion has played the dominant role, although most previous authors have assumed otherwise. It is also shown that surface diffusion predominates in normal field-emission tip blunting and also for the coalescence of gas bubbles introducted into metals by alpha bombardment. The surface-diffusion solutions for a perturbed sphere are combined with previous results for volume diffusion to show that the inclusion of interface diffusion permits considerably larger spheres to develop in diffusion-controlled precipitate growth before the onset of instability. A mechanism is also proposed for the spheroidization of precipitate platelets as well as rods. (Author)

AD-624 033 Fld. 11/6
NORTH CAROLINA STATE UNIV RALEIGH
DIE NICKELECKE IM DREISTOFFYSTEM NICKELTITAN-BOR (THE NICKEL CORNER IN THE TRI-COMPONENTSYSTEM NICKEL-TITANIUM-BORON),
by J. D. Schobel, and H. H. Stadelmaier. 1965, 3p. Contract DA-31-124-ARO (D)-277 AROD 5010:4
Unclassified report

Availability: Published in Metall Sonderdruck aus V7 N19 P715-7 Jan 1965.

Descriptors: (*Nickel alloys, Phase studies), (*Titanium alloys, Nickel alloys), (*Boron alloys, Nickel alloys), Microstructure

AD-624 101 Fld. 11/6, 20/6, 20/12
CFSTI Prices: HC $1.00 MF $0.50
INSTITUT D'OPTIQUE PARIS (FRANCE)
STUDY OF OPTICAL AND TRANSPORT PROPERTIES OF THIN FILMS OF METALS AND ALLOYS.
Final scientific rept.,
by F. Abeles. 9 Jul 65, 16p. Contract AF-EOAR-48-63 Proj. AF-9763 Task 9763-02 AFOSR 65-1677
Unclassified report

Descriptors: (*Metal films, Physical properties), (*Optical properties, Metal films), (*Transport properties, Metal films), Alloys, Measurement, Goniometers, Surface properties, Resistance (Electrical), Gold, Copper, Palladium, Manufacturing methods, Gold alloys, Oxides, France

The results of the following investigations are presented: (1) Improvements to the preparation and fabrication of evaporated thin metallic films; (2) Comparison of thin film thickness using x-rays, the temperature coefficient of the resistivity and goniophotometric measurements; (3) Use of goniophotometric measurements for detecting very thin surface layers (oxides); (4) Use of ellipsometric measurements for study of thin films and surfaces, with new instrumentation; (5) Measurement of resistivity and Hall constant of thin metal films in vacuo with high accuracy; (6) Use of the optical and electrical measurements performed on the same film in order to determine the scattering parameter and the optical effective mass of the conduction electrons, and the resistivity due to defects in the film; and (7) New results concerning the optical properties of Au, Cu, Pd, and Au-Pd. (Author)

AD-623 730 **See Fld. 10/1**

AD-623 816 **See Fld. 20/3**

AD-623 906 **See Fld. 7/4**

AD-623 931 **See Fld. 20/2**

AD-624 126 **See Fld. 7/4**

AD-624 134 **See Fld. 7/4**

11/7. MISCELLANEOUS MATERIALS

AD-624 126 **See Fld. 7/4**

11/8. OILS, LUBRICANTS, AND HYDRAULIC FLUIDS

AD-623 998 **See Fld. 20/4**

11/9. PLASTICS

AD-624 040 Fld. 11/9, 20/6
MASSACHUSETTS UNIV AMHERST POLYMER RESEARCH INST
DYNAMIC DICHROISM OF DYED POLYMER FILMS,
by R. Yamada, and R. S. Stein. 17 Aug 64, 8p. AROD 4051:5
Unclassified report

Supported in part by Office of Naval Research, Washington, D. C.

Availability: Published in Polymer Letters V2 P1131-8 1964. Copies to DDC users only.

Descriptors: (*Polymers, Films), (*Films, Optical properties), (*Nylon, Optical properties), (*Optical phenomena, Polymers), Crystals, Glass, Refraction, Reflection, Colors, Stresses, Strain (Mechanics), Modulus of elasticity, Frequency, Deformation, Dyes

Measurements are reported for variation of the dichroism ration (D-1)/ (D+2), birefringence, and stress with strain; resolution of total birefringence change with strain into crystalling and amorphous contributions; change in (D-1)/ (D+2), birefringence, and stress with time at constant elongation; change in real dichroismstrain coefficient, strain-optical coefficient K', and modulus with frequency; and resolution of the frequency dependence of K' into crystalline and amorphous contributions, all of congo-red-dyed nylon-6 films.

AD-624 140 Fld. 11/9, 20/2
CFSTI Prices: HC $1.00 MF $0.50
RENSSELAER POLYTECHNIC INST TROY N Y DEPT OF CHEMISTRY
SEEDING OF SUPERCOOLED POLYETHYLENE WITH EXTENDED CHAIN CRYSTALS.
Technical rept.,
by Bernhard Wunderlich, and C. M. Cormier.
Oct 65, 25p. Rept. no. tr-9
Contract Nonr-591 (19) Proj. NR-051-428
Unclassified report

Descriptors: (*Polyethylene plastics, Crystal growth), (*Crystal growth, Polyethylene plastics), (*Nucleation, Polyethylene plastics), Supercooling, Polymerization, Crystallization, Calorimetry, Specific heat, Heat of fusion, Melting, Additives, Solutions

Seeding of supercooled polyethylene melt and solution with extended chain single crystals did not markedly decrease the degree of supercooling necessary to initiate crystal growth. No extended chain growth was induced with these nuclei. An analysis of the first traces of crystal growth allowed some conclusion about nucleation and growth mechanism. In order to account for the measurement, a growing crystal must have a 10,000 to 30,000 A thick surface layer which increases in perfection from the outside to the inside. A differential scanning calorimeter was used for most of the experiments. (Author)

AD-624 170 Fld. 11/9, 7/3
NOYES CHEMICAL LAB UNIV OF ILLINOIS URBANA
DISILOXANE BENZIMIDAZOLE POLYMERS,
by J. E. Mulvaney, and C. S. Marvel. 19 Dec 60, 7p. Contract AF33 (616)-5486 Grant ,NSF-G-5906
Unclassified report

Availability: Published in Journal of Polymer Science V50 P541-7 1961. Copies to DDC users only.

Descriptors: (*Siloxanes, Polymers), (*Benzimidazoles, Polymers), (*Polymers, Synthesis (Chemistry)), Heatresistant plastics, Solubility, Melting point

Two new benzimidazole polymers containing disiloxane linkages in the chain backbone were synthesized. These materials show fair thermal stability and have greater solubilities and much lower melting points than previously reported fully aromatic poly benzimidazoles (see AD-624 171). The syntheses of the required disiloxane monomers are also described. (Author)

AD-624 171 Fld. 11/9, 7/3
NOYES CHEMICAL LAB UNIV OF ILLINOIS URBANA
POLYBENZIMIDAZOLES, NEW THERMALLY STABLE POLYMERS,
by Herward Vogel, and C. S. Marvel. 27 Nov 60, 29p. Contract AF33 (616)-5486 Grant ,NSF-G-2626
Unclassified report

Availability: Published in Journal of Polymer Science V50 P511-39 1961. Copies to DDC users only.

Descriptors: (*Benzimidazoles, Polymers), (*Heatresistant plastics, Benzimidazoles), (*Polymers, Synthesis (Chemistry)), Aromatic compounds, Amines, Stability, Melting point, Hydrolysis

A variety of polybenzimidazoles was synthesized by melt polycondensation of suitable aromatic tetraamines. The polymers have a high degree of resistance to treatment with hydrolytic media and an ability to withstand continued exposure to elevated temperatures (400-600C).

AD-623 857 **See Fld. 7/3**

AD-623 981 **See Fld. 6/5**

AD-623 982 **See Fld. 6/5**

AD-624 168 **See Fld. 20/11**

11/10. RUBBERS

AD-623 709 Fld. 11/10, 7/4
WISCONSIN UNIV MADISON DEPT OF CHEMISTRY
DYNAMIC MECHANICAL PROPERTIES OF CROSSLINKED RUBBERS. II. EFFECTS OF CROSS-LINK SPACING AND INITIAL MOLECULAR WEIGHT IN POLYBUTADIENE,
by Etsuji Maekawa, Ralph G. Mancke, and John D. Ferry. 13 May 65, 7p. AROD 4129:5
Unclassified report

Availability: Published in Journal of Physical Chemistry V69 N9 P2811-7 Sep 1965. Copies to DDC users only.

Descriptors: (*Synthetic rubber, Mechanical properties), (*Vulcanizates, Mechanical properties), (*Butadienes, Mechanical properties), Crosslinking (Chemistry), Polymers, Shear stresses, Torsion, Molecular structure, Molecular weight, Peroxides, Sulfur, Dynamics

The complex shear compliances of eight samples of polybutadiene cross linked by dicumyl peroxide and four samples cross linked by sulfur were measured over a frequency range from 0.2 to 2 c.p.s. at temperatures from -6 to 45C by a torsion pendulum. On four of the samples, measurements were extended by the Fitzgerald transducer from 45 to 600 c.p.s. at temperatures from -71 to 55C. In the transition zone of frequencies, the viscoelastic functions of the dicumyl peroxide vulcanizates were closely similar, except for a shift toward lower frequencies with increasing cross linking, corresponding to a small but unexpected increase in the monomeric friction coefficient. Cross linking by sulfur caused a somewhat larger shift toward lower frequencies at a comparable cross-link density. In the rubbery zone, the sample with least cross linking exhibited a substantial secondary loss mechanism at very low frequencies. The low-frequency losses are evident in all the samples, but their magnitude falls rapidly with increasing cross-link density as previously found for natural rubber. (Author)

11/12. WOOD AND PAPER PRODUCTS

AD-624 205 **See Fld. 7/3**

12/1. MATHEMATICS AND STATISTICS

AD-623 726 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
VIRGINIA POLYTECHNIC INST BLACKSBURG
THE PARAMETRIC EMPIRICAL BAYES APPROACH TO STATISTICAL HYPOTHESIS TESTING AND POINT ESTIMATION,
by J. R. Rutherford, and R. G. Krutchkoff. 1965, 28p. Contract DA-ARO (D)-31-124-G410
Unclassified report

Descriptors: (*Statistical tests, Optimization), Sequences, Distribution functions, Stochastic processes

Several papers have been written giving empirical Bayes estimators or tests of hypothesis which are asymptotically optimal for particular conditional distributions. In this paper sufficient conditions are given for a sequence of point estimators or tests of hypothesis to be asymptotically optimal. Two general methods are then given which can be used to find these sequences for a wide class of conditional distributions. (Author)

AD-623 737 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
PROOF OF THE FIXED POINT THEOREMS OF POINCARE AND BIRKHOFF,
by R. B. Barrar. 21 Oct 65, 23p. Rept. no. sp-2235/000/00
Unclassified report

Descriptors: (*Theorems, Topology), (*Topology, Theorems), Transformations (Mathematics), Functional analysis

A topological proof is presented of the fixed point theorems of Birkhoff and Poincare. The proof is modeled after the simplest proofs of the Brouwer Plane Translation Theorem and even improves on these in several respects. (Author)

AD-623 739 Fld. 12/1, 20/3, 9/2
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
APPROXIMATE SOLUTION OF THE EXTERIOR DIRICHLET PROBLEM AND THE CALCULATION OF ELECTROSTATIC CAPACITY,
Technical summary rept.,
by Donald Greenspan, and Edward Silverman.
Aug 65, 17p. Rept. no. mrc-TSR-538
Contract DA-11-022-ORD-2059
Unclassified report

Descriptors: (*Boundary value problems, Approximation (Mathematics)), (*Capacitance, Boundary value problems), (*Electrostatics, Potential theory), Partial differential equations, Programming (Computers)

A digital computer technique is described for approximating the solution of the exterior Dirichlet problem. The essence of the method is the combination of geometric inversion with a method for approximating the solution of an interior Dirichlet problem. Two and three dimensional problems are discussed separately because each requires a different treatment of boundary data. The technique for three dimensions extends to higher dimensional problems. Application is made to the calculation of electrostatic capacity by reducing the usual formula for capacity to one which requires only the evaluation at the origin of the solution of a particularly simple interior Dirichlet problem. Finally, the capacity of a unit cube is estimated to be 0.661. (Author)

AD-623 741 Fld. 12/1, 20/10
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
OBSERVABLES AND DERIVABLES PART III: SEMI-GROUPS.
Technical summary rept.,
by Stanley P. Gudder. Jul 65, 11p. Rept. no. mrc-TSR-573
Contract DA-11-022-ORD-2059
Unclassified report

See also AD-623 743 and AD-616 868.

Descriptors: (*Functional analysis, Quantum mechanics), (*Quantum mechanics, Groups (Mathematics)), (*Groups (Mathematics), Operators (Mathematics)), Probability, Momentum

The temporal development or dynamics of a quantum mechanical system is usually described in terms of a semi-group of unitary operators. In any more general axiomatic formulation of quantum mechanics a similar assumption would likely be made. The energy observable is defined as the infinitesimal generator of this semi-group. Also, the momentum observables are defined as the infinitesimal generators of semi-groups corresponding to rigid motions in configuration space. Basic results are derived concerning semi-groups of bounded simultaneous derivables.

AD-623 742 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
ON ORTHOGONAL M-PODS ON A CONE.
Technical summary rept.,
by H. B. Mann. Jun 65, 11p. Rept. no. mrc-TSR-575
Contract DA-11-022-ORD-2059
Unclassified report

Descriptors: (*Conical bodies, Polynomials), Geometry, Theorems, Matrix algebra, Transformations (Mathematics)

AD-623 743 Fld. 12/1, 20/10
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
OBSERVABLES AND DERIVABLES PART II: UNIQUENESS AND EXISTENCE PROPERTIES.
Technical summary rept.,
by Stanley P. Gudder. Jul 65, 20p. Rept. no. mrc-TSR-577
Contract DA-11-022-ORD-2059
Unclassified report

See also AD-616 868.

Descriptors: (*Functional analysis, Quantum mechanics), (*Quantum mechanics, Functional analysis), Probability, Operators (Mathematics), Algebra, Mathematical logic

Certain uniqueness and existence properties of bounded observables are discussed. The uniqueness problem considers the question: if two bounded observables have the same expectations in every state, are the observables equal. We say that an observable z is the sum of two bounded observables x and y if the expectation of z is the sum of the expectations of x and y for every state. The existence problem poses the question: does the sum of two bounded observables exist. Only partial answers to these questions have been found. It is shown that the uniqueness property holds for simultaneous observables and certain classes of non-simultaneous or complementary observables. The existence property holds for simultaneous observables and a counterexample is given which shows that this property does not hold in general. Logics in which the uniqueness and existence properties hold are considered. (Author)

AD-623 744 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
A NEW PROOF OF THE REDUCIBILITY OF APPELL'S HYPERGEOMETRIC FUNCTION OF TWO VARIABLES.
Technical summary rept.,
by F. M. Ragab. Sep 65, 7p. Rept. no. mrc-TSR-588
Contract DA-11-022-ORD-2059
Unclassified report

Descriptors: (*Special functions (Mathematical), Taylor's series), (*Matrix algebra, Transcendental functions), Functional analysis, Calculus of variations, Geometry

A new proof is given for the reducible case of Appell's function. (Author)

AD-623 745 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
EXPANSIONS OF KAMPE DE FERIET'S DOUBLE HYPERGEOMETRIC FUNCTION OF HIGHER ORDER.
Technical summary rept.,
by F. M. Ragab. Sep 65, 21p. Rept. no. mrc-TSR-589
Contract DA-11-022-ORD-2059
Unclassified report

Descriptors: (*Special functions (Mathematical), Taylor's series), (*Matrix algebra, Transcendental functions), Functional analysis, Calculus of variations, Bessel functions

Expansions of Kampe de Feriet's double hypergeometric function of higher order (i.e. with more parameters) in two variables are obtained. By specializing the number of the parameters in this function, new and known expansions of the four double hypergeometric functions of two variables are deduced. (Author)

AD-623 746 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
E-TRANSFORMS (II).
Technical summary rept.,
by F. M. Ragab. Jul 65, 27p. Rept. no. mrc-TSR-579
Contract DA-11-022-ORD-2059
Unclassified report

Descriptors: (*Integral transforms, Special functions (Mathematical), Bessel functions, Integrals

A new class of integral transforms is established. Special choices of the parameters in this new transform pair lead in turn to the derivation of Kontorovich-Lebedev transforms, generalized Mehler transforms, and other new transforms. (Author)

AD-623 748 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
INTEGRATION OF KAMPE DE FERIET'S HYPERGEOMETRIC FUNCTIONS WITH REGARD TO THEIR PARAMETERS.
Technical summary rept.,
by F. M. Ragab. Sep 65, 24p. Rept. no. mrc-TSR-593
Contract DA-11-022-ORD-2059
Unclassified report

Descriptors: (*Integration, Special functions (Mathematical)), (*Special functions (Mathematical), Integration), Theorems, Integrals

Integrals with respect to the parameters of Kampe de Feriet's hypergeometric function, of this function are evaluated. (Author)

AD-623 749 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
RECENT ADVANCES IN DIFFERENCE SETS,
Technical summary rept.,
by Henry B. Mann. Jul 65, 15p. Rept. no. mrc-TSR-594
Contract DA-11-022-ORD-2059
Unclassified report

Descriptors: (*Set theory, Groups (Mathematics)), Combinatorial analysis, Matrix algebra

An enumeration of cyclic difference sets by Marshall Hall in 1956 left 12 cases undecided. During the last three years all 12 cases were disposed of.

The present paper combines methods of Yamamoto and Turyn to present a result which disposes not only of Hall's 12 cases but also of many other cases including non cyclic ones. Some of the author's results on difference sets in elementary Abelian groups are also discussed. (Author)

AD-623 750 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
INTEGRALS INVOLVING KAMPE DE FERIET'S DOUBLE HYPERGEOMETRIC FUNCTION OF HIGHER ORDER,
Technical summary rept.,
by F. M. Ragab. Sep 65, 30p. Rept. no. mrc-TSR-599
Contract DA-11-022-ORD-2059
Unclassified report

Descriptors: (*Integrals, Special functions (Mathematical)), (*Special functions (Mathematical), Integrals), Integration

Infinite integrals involving Kampe de Feriet's hypergeometric function of higher order are evaluated. (Author)

AD-623 764 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
INFINITE SERIES OF KAMPE DE FERIET'S DOUBLE HYPERGEOMETRIC FUNCTION OF HIGHER ORDER.
Technical summary rept.,
by F. M. Ragab. Sep 65, 15p. Rept. no. mrc-TSR-587
Contract DA-11-022-ORD-2059
Unclassified report

Descriptors: (*Special functions (Mathematical), Series), (*Series, Special functions (Mathematical))

Infinite series for Kampe de Feriet's hypergeometric functions of two variables are established. Particular cases involving expansions of Appel's functions are deduced.

AD-623 766 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
LIMIT CYCLES AND ROTATED VECTOR FIELDS.
Technical summary rept.,
by W. A. Coppel. Jul 65, 14p. Rept. no. mrc-TSR-583
Contract DA-11-022-ORD-2059
Unclassified report

Descriptors: (*Differential equations, Topology), Vector analysis, Theory, Real variables

The paper discusses conditions under which a two-dimensional autonomous system has at most one cycle. A previous result is improved by means of a suitable extension of the theory of rotated vector fields. (Author)

AD-623 767 Fld. 12/1, 20/10
CFSTI Prices: HC $3.00 MF $0.75
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
SOME ABSOLUTELY CONTINUOUS OPERATORS II.
Technical summary rept.,
by P. A. Rejto. Jul 65, 66p. Rept. no. mrc-TSR-582
Contract DA-11-022-ORD-2059
Unclassified report

Descriptors: (*Operators (Mathematics), Functional analysis), (*Functional analysis, Operators (Mathematics)), (*Quantum mechanics, Perturbation theory)

Abstract conditions are formulated for the absolute continuity of the part of an operator over an interval. These conditions are verified, in particular, for a class of Schrodinger operators, entering the two body problem. This shows that the continuous part of these operators is absolutely continuous. (Author)

AD-623 795 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
FACTOR ANALYSIS BY MINIMIZING RESIDUALS (MINRES).
Professional paper,
by Harry H. Harman, and Wayne H. Jones. 10 Jul 65, 37p. Rept. no. SP-2134
Unclassified report

Research supported in part by ONR.

Descriptors: (*Factor analysis, Optimization), Least squares method, Matrix algebra, Analysis of variance

This paper describes a new method of factor analysis, built on the foundations of the subject laid in the 1930's, but not realizable before the advent of modern-day computing capabilities. Specifically, the new method estimates factor loadings in such a way as to make the sum of squares of off-diagonal residuals a minimum. Communalities consistent with this criterion are produced as a by-product. Several distinct computing procedures were considered in the course of the experimental work before a highly efficient technique was developed. The final procedure is illustrated with a numerical example. Some important properties of a minres solution are emphasized, including its relationship to principal-factor analysis and maximumlikelihood factor estimates. Finally, several unresolved problems are pointed out as a guide to possible future research. (Author)

AD-623 819 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ANALYSIS OF OPTIMALIZING CONTROL SYSTEMS UNDER RANDOM INTERFERENCE,
by Au-young King-ching. 9 Nov 65, 28p. Rept. no. ftd-TT-64-1119
TT 65-64562
Unclassified report

Edited trans. of Tzu Tung Hua Hsueh Pao (Chinese People's Republic) v1 n2 p59-73 1963.

Descriptors: (*Optimization, Control systems), (*Control systems, Interference), Approximation (Mathematics), China

Two types of optimalizing control systems are analyzed and compared under conditions of random interference. By an approximate method, the expected hunting-loss values are calculated. The advantages and disadvantages of these control-system types can be compared under actual circumstances. In the case of Gaussian steadystate random interference, the correlation-type system has a smaller hunting loss when the interference at the input terminal is stronger than that at the output terminal, but when the situation is reversed, the gradient-type optimalizing system has smaller hunting losses. The calculation results give us the best step length for the gradient-type optimalizing system and the best hunting amplitude for the correlation-type optimalizing system for various noise levels. These results are important parameters of the control systems. (Author)

AD-623 829 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS
SEQUENTIAL RANK TESTS, II. A MODIFIED TWOSAMPLE PROCEDURE.
Technical rept.,
by Ralph A. Bradley, Sarla D. Merchant, and Frank Wilcoxon. 15 Jun 65, 21p. Rept. no. fsu-Statistics-M80
Contract Nonr-988 (08) Proj. NR-042-004 ONR TR-16
Unclassified report

Descriptors: (*Sequential analysis, Monte Carlo method), (*Monte Carlo method, Sequential analysis), Factor analysis, Statistical analysis

This paper describes modifications of the sequential, two-sample, within-group, rank tests developed earlier. A modified, configural rank test is discussed in some detail and is a procedure based on rerankings of observations as new groups of observations are obtained sequentially. A numerical application is given. Monte Carlo results are presented on the modified, configural rank test and compared with earlier studies. Proofs of termination of the test are reported and outstanding unsolved problems noted. (Author)

AD-623 831 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS
A NOTE ON THE RATIO OF STEADY STATE PROBABILITIES FOR ERGODIC MARKOV CHAINS.
Technical rept.,
by Vincent Hodgson. 15 Sep 65, 6p. Rept. no. fsu-Statistics-M91
Contract Nonr-988 (08) Proj. NR-042-004 ONR TR-18
Unclassified report

Descriptors: (*Probability, Measure theory), (*Measure theory, Probability)

A new derivation is given of the result that the ratio of steady state probabilities P sub j/P sub i is equal to the expected number of times a Markov chain starting at state i is in state j before it returns to state i. (Author)

AD-623 832 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS
PROPERTIES OF THE GENERALIZED SPRT BASED ON RANKS.
Technical rept.,
by I. Richard Savage, and J. Sethuraman. 10 Aug 65, 16p. Rept. no. fsu-Statistics-M84
Contract Nonr-988 (13) Grant ,NSF-GP-3836
Proj. NR-042-003
Unclassified report

Descriptors: (*Sequential analysis, Probability), (*Statistical tests, Stochastic processes), Statistical distributions, Distribution functions

Let (X sub l, Y sub l), (*S sub 2, Y sub 2),...be independently and identically distributed bivariate random variables with a joint distribution H (.,.) which has continuous marginal distribution F (.) and G (.). The authors test the null hypothesis H sub o: X,Y are independent, and G = F against the alternative hypothesis H sub 1: X,Y are independent, and G = F (A) where a > 1 is a known constant. At the n (th) state of experimentation the available information is the ranks of (Y sub 1, . . ., Y sub n) among (X sub 1, . . . , X sub n, Y sub 1, . . . Y sub n). Use is made of a sequential probality-ratio test based on ranks. If the distribution of (X,Y) is H (.,.) with marginals F (.) and G (.) and S (A,H) = S (A,F,G) does not equal o where S (A,F,G) = log 4A-2-integral log (F (x) + AG (x)) (dF (x)) that this sequential test terminates with probability 1 and that the moment generating function of the required sample size is finite.

AD-623 833 Fld. 12/1
CFSTI Prices: HC $3.00 MF $0.50
FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS
MONOTONICITY OF RANK ORDER LIKELIHOOD RATIOS.
Technical rept.,
by K. M. Lal Saxena. 1 Sep 65, 51p. Rept. no. fsu-Statistics-M85
Contract Nonr-988 (13) Proj. NR-042-003
Unclassified report

Descriptors: (*Statistical analysis, Probability), (*Stochastic processes, Statistical analysis), Distribution functions, Monte Carlo method

AD-623 834 Fld. 12/1
CFSTI Prices: HC $3.00 MF $0.75
FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS
SOME NONPARAMETRIC BAYESIAN ESTIMATION PROBLEMS.
Technical rept.,
by K. M. Lal Saxena. 1 Oct 65, 70p. Rept. no. fsu-Statistics-M100
Contract Nonr-988 (13) Proj. NR-042-033
Unclassified report

Descriptors: (*Decision theory, Statistical analysis), (*Statistical analysis, Decision theory), Stochastic processes, Distribution functions

Two sample nonparametric decision problems for single parameter families of distributions are considered from the Bayesian viewpoint when only the relative magnitudes of the observation are known for the paired comparison data, the rank order data and the signed rank order data. The term nonparametric is used as the decision procedures depend on nonparametric statistics. It is assumed that the likelihood functions for the three kinds of data depend on the parameters of the sampled populations through some function H. A prior distribution is considered for the random variable H. The problem of the Bayes estimation of H, with the squared error loss function, is considered for the three kinds of data. A number of analytic properties of the posterior distribution of H and the orderings of the values of the Bayes estimate of H are obtained. Examples are given from a normal and a uniform family of distributions. Sufficient conditions are given on the sampled populations for the risk of the Bayes estimate of H to go to zero as the sample sizes go to infinity for the three kinds of data. The Bayes two decision problem, the two decisions being H > h and H < or = h, with the (0,1) loss function, is considered for the paired comparison data and the rank order data. Monotonic properties of the Bayes decision procedures are obtained under mild conditions on the sampled populations. Sufficient conditions on the sampled populations are given for the risk of the Bayes two decision procedures to go to zero as the sample sizes go to infinity. (Author)

AD-623 862 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
STANFORD UNIV CALIF DEPT OF STATISTICS
ASYMPTOTIC DISTRIBUTION OF LINEAR COMBINATIONS OF FUNCTIONS OF ORDER STATISTICS WITH APPLICATIONS TO ESTIMATION.
Technical rept.,
by Herman Chernoff, Joseph L. Gastwirth, and M. V. Johns,Jr.. 30 Sep 65, 44p. Rept. no. tr-110
Contract Nonr-225 (52) Proj. NR-342-022
Unclassified report

Descriptors: (*Distribution theory, Statistical functions), (*Statistical functions, Distribution theory), Asymptotic series, Stochastic processes, Distribution functions, Statistical distributions

AD-623 863 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
STANFORD UNIV CALIF DEPT OF STATISTICS
SUPPORTS OF CONVOLUTIONS OF IDENTICAL DISTRIBUTIONS.
Technical rept.,
by Herman Rubin. 26 Jul 65, 19p. Rept. no. tr-53
Contract Nonr-225 (72) Proj. NR-042-993
Unclassified report

Descriptors: (*Statistical distributions, Stochastic processes), (*Stochastic processes, Distribution functions), Measure theory

Simple examples are given of convolutions of identical singular univariate distributions whose convolution is absolutely continuous. Furthermore, it is shown that there exist infinitely divisible univariate distributions F and G such that the Hausdorff dimensions of the supports (lowest-dimensional sets of probability 1) of F (t), G (t), and F (t) * G (t) have any preassigned behavior consistent with non-decrease under convolution. Absolute continuity can be included as a dimension greater than 1. Furthermore, the Levy-Khintchine representations of F and G may be required to be purely discrete or purely signular. (Author)

AD-623 864 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
STANFORD UNIV CALIF DEPT OF STATISTICS
LACK OF MINIMAX PROPERTY OF SOME TESTS ON A MULTIVARIATE PROBLEM.
Technical rept.,
by Narayan Ghandra Giri. 15 Jul 65, 17p. Rept. no. tr-52
Contract Nonr-225 (72) Proj. NR-042-993
Unclassified report

Descriptors: (*Statistical tests, Multivariate analysis), (*Multivariate analysis, Statistical tests), (*Minimax technique, Statistical tests), Probability, Power series

AD-623 907 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
MISSOURI UNIV COLUMBIA
TESTING AGAINST TREND IN STOCHASTIC PROCESSES.
Final rept.,
by H. D. Brunk, and D. L. Hanson. 8 Oct 65, 3p.
Contract DA-31-124-ARO (D)-158 Proj.
AROD-CRD-AA-M-4583 AROD 4583:1
Unclassified report

Descriptors: (*Stochastic processes, Statistical tests), Scientific research, Scientific personnel

AD-623 921 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS SOLID STATE SCIENCES LAB
ON THE THEORY OF BOOLEAN FORMULAS: ALLOWABLE REPLACEMENT FOR SUBFORMULAS.
Physical and mathematical sciences research papers,
by E. W. Samson, and L. Calabi. Aug 65, 34p. Rept. no. pmsrp-129
Proj. AF-4608 Task 460805
AFCRL 65-64
Unclassified report

Prepared in cooperation with Parke Mathematical Labs., Inc., Carlisle, Mass. Contracts AF19 (628)-2417, AF19 (628)-4790.

Descriptors: (*Algebras, Theory), Operators (Mathematics), Set theory, Mathematical logic, Special functions (Mathematical), Computer logic

The theory of substitutions for Boolean formulas developed in a previous report is applied here to the determination of those s-tuples of formulas that may be allowable eplacements for s -tuples of subformulas of given Boolean formulas. The criteria of allowability are very general and flexible, yet may be expressed with great precision and ease. The results formalize and extend various known isolated instances. They may be used for the study of a large number of problems in the theory and application of Boolean formulas and functions. (Author)

AD-623 964 Fld. 12/1
NAVAL ORDNANCE TEST STATION CHINA LAKE CALIF
UNIFIED LEAST SQUARES ANALYSIS,
by C. A. Rohde, and J. R. Harvey. Nov 65, 9p. Rept. no. nots-TP-3952
NAVWEPS 8985
Unclassified report

Availability: Published in Journal of the American Statistical Association V60 P523-7 Jun 1965. Copies to DDC users only.

Descriptors: (*Least squares method, Linear systems), (*Analysis of variance, Linear systems), Matrix algebra, Model theory

It is seen (through consideration of generalized inverses) that the abbreviated Doolittle method serves, in problems of linear estimation, as a solution technique for models of less than full rank as well as for models of full rank, and in identically the same fashion. Thus the method assumes increased importance as a research and pedagogical device, as well as a computing technique. (Author)

AD-624 021 Fld. 12/1
CFSTI Prices: HC $3.00 MF $0.50
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH MATHEMATICS RESEARCH LAB
BOUNDS ON INTERVAL PROBABILITIES FOR RESTRICTED FAMILIES OF DISTRIBUTIONS,
by R. E. Barlow, and A. W. Marshall. Sep 65, 51p. Rept. no. D1-82-0473 ,Mathematical note-429
Contract Nonr-3656 (18)
Unclassified report

Prepared for presentation at the Berkeley Symposium on Mathematical Statistics and Probability (5th), 21Jun-18 65. Also available from the Authors.

Descriptors: (*Probability, Statistical distributions), (*Distribution functions, Probability), Hazards, Stochastic processes

For several families of distributions F (x) = P (X < or = x), sharp bounds are obtained. These families are all restricted by a moment condition, and in every case we assume that P (X < 0) = 0. In addition one of the following conditions is imposed: (i) F is concave on (0, infinity), (ii) F has an increasing hazard rate, (iii) F has a density that is a Polya frequency function of order 2, (iv) F has a decreasing hazard rate, (v) F has an increasing hazard rate average. Bounds are also obtained on the corresponding densities and hazard rates.

AD-624 026 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
WISCONSIN UNIV MADISON DEPT OF STATISTICS
A NOTE ON THE 'INVERTED' MULTIVARIATE BETA DISTRIBUTION WITH APPLICATIONS.
Technical rept.,
by George C. Tiao, and Irwin Guttman. Jul 64, 12p. Rept. no. tr-34
Contract Nonr-1202 (17) Proj. NR-042-222
Unclassified report

Descriptors: (*Statistical distributions, Distribution theory), Multivariate analysis, Matrix algebra, Transformations (Mathematics)

The multivariate 'inverted' beta distribution obtained by the authors is a generalization of the wellknown univariate 'inverted' beta distribution.

Some properties of the distribution are discussed. Its connection with the multivariate student-t distribution is shown. Finally, an application which involves a preposterior analysis of the scale parameter of a normal process is given.

AD-624 027 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
WISCONSIN UNIV MADISON DEPT OF STATISTICS
DESIGNS WHICH MINIMIZE MODEL INADEQUANCIES: CUBOIDAL REGIONS OF INTEREST.
Technical rept.,
by Norman R. Draper, and Willard E. Lawrence.
Jul 64, 32p. Rept. no. tr-36
Contract Nonr-1202 (17) Proj. NR-042-222
Unclassified report

Descriptors: (*Combinatorial analysis, Functional analysis), (*Experimental design, Optimization), Matrix algebra, Invariance, Mathematical models

AD-624 031 Fld. 12/1
WASHINGTON UNIV ST LOUIS MO
ON THE THEORY OF LIPSCHITZ SPACES OF DISTRIBUTIONS ON EUCLIDEAN N-SPACE. II. TRANSLATION INVARIANT OPERATORS, DUALITY, AND INTERPOLATION,
by Mitchell H. Taibleson. 1965, 20p. Contract DA-31-124-ARO (D)-58 AROD 3076:10
Unclassified report

Availability: Published in Journal of Mathematics and Mechanics V14 N5 P821-40 Sep 1965. Copies to DDC users only.

Descriptors: (*Operators (Mathematics), Functional analysis), (*Functional analysis, Distribution theory), Measure theory, Linear programming, Theorems, Approximation (Mathematics)

AD-624 065 Fld. 12/1
HARVARD UNIV CAMBRIDGE MASS
EXPECTED SIGNIFICANCE LEVEL AS A SENSITIVITY INDEX FOR TEST STATISTICS,
by A. P. Dempster, and M. Schatzoff. 1965, 19p.
Contract Nonr-1866 (37) Proj. NR-042-097
Unclassified report

Availability: Published in Journal of the American Statistical Association V60 P420-36 Jun 1965. Copies to DDC users only.

Descriptors: (*Statistical tests, Sensitivity), Probability, Monte Carlo method, Analysis of variance, Sampling, Exponential functions

After a brief motivating discussion of approaches to significance tests, the concept of expected significance level (ESL) is defined and its basic properties are presented. The relationship between ESL and the familiar criterion of power is discussed. While a complete description of power for each size observed significance level is more informative than ESL, it is argued that ESL is often a reasonable compromise between high ideals and practicability. Two estimation methods are given for Monte Carlo simulation of ESL and it is shown how to estimate variances and covariances for the second of these methods. The first method leads to the familiar Wilcoxon two-sample statistic which is clearly a sample analogue of ESL. The second and more apposite method leads to a modification of the Wilcoxon statistic. (Author)

AD-624 072 Fld. 12/1
PENNSYLVANIA UNIV PHILADELPHIA
SCALAR DILATIONS AND SCALAR EXTENSION OF OPERATORS ON BANACH SPACES (I),
by C. Ionescu Tulcea. 1965, 17p. Contract DA-ARO (D)-31-124-G218 AROD 3333:14
Unclassified report

Prepared in cooperation with Rutgers - The State Univ., New Brunswick, N. J., Grant DA-ARO (D)-31-124-G195, and Illinois Univ., Urbana.

Availability: Published in Journal of Mathematics and Mechanics V14 N5 P841-56 Sep 1965. Copies to DDC users only.

Descriptors: (*Operators (Mathematics), Functional analysis), (*Functional analysis, Operators (Mathematics)), Algebras, Mapping (Transformations), Measure theory, Complex variables

AD-624 114 Fld. 12/1
CALIFORNIA UNIV LOS ANGELES
THE SPAN AND PRINCIPAL FUNCTIONS IN RIEMANNIAN SPACES,
by Leo Sario, Menahem Schiffer, and Moses Glasner. 16 Feb 65, 22p. Contract DA-ARO (D)-31-124-G499 AROD 1517:70
Unclassified report

Prepared in cooperation with Stanford Univ., Calif., Contract AF49 (638)-1345.

Availability: Published in Journal D'Analyse Mathematique V15 P115-34 1965.

Descriptors: (*Algebraic topology, Potential theory), (*Potential theory, Algebraic topology), Green's function, Operators (Mathematics), Differential geometry, Boundary value problems

AD-624 116 Fld. 12/1
CALIFORNIA UNIV LOS ANGELES
EXISTENCE OF COMPLETE MINIMAL SURFACES OF ARBITRARY CONNECTIVITY AND GENUS,
by Tilla Klotz, and Leo Sario. 17 May 65, 4p.
Contract DA-ARO (D)-31-124-G499 ,NSF-GP-2567 AROD 1517:81
Unclassified report

Availability: Published in Proceedings of the National Academy of Sciences V54 N1 P42-4 Jul 1965. Copies to DDC users only.

Descriptors: (*Differential geometry, Conformal mapping), Distribution theory, Complex variables, Functions, Potential theory

The authors show that there exist complete minimal surfaces of arbitrary finite or infinite connectivity and genus, smoothly immersed in the Euclidean 3-space.

AD-624 123 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
INVARIANT IMBEDDING AND THE NUMERICAL INTEGRATION OF BOUNDARY-VALUE PROBLEMS FOR UNSTABLE LINEAR SYSTEMS OF ORDINARY DIFFERENTIAL EQUATIONS,
by R. E. Bellman, H. H. Kagiwada, and R. E. Kalaba. Oct 65, 14p. Rept. no. rm-4800-PR
Contract AF49 (638)-700
Unclassified report

Descriptors: (*Boundary value problems, Integration), (*Integration, Boundary value problems), (*Invariance, Boundary value problems), Integral equations, Transport properties, Optimization, Control, Planetary atmospheres, Differential equations

In such diverse areas as radiative transfer in planetary atmospheres and optimal guidance and control, two-point boundary-value problems for unstable systems arise, greatly complicating the numerical solution. An invariant imbedding technique is presented which is useful in overcoming these frequently encountered instabilities, and the results of some numerical experiments are presented. (Author)

AD-624 128 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
NAVAL ORDNANCE LAB WHITE OAK MD
MATRIX ELEMENTS AND PARTIAL TRACES OF PRODUCTS OF PAIRS OF SPIN OPERATORS,
by Louis F. Libelo. Dec 65, 17p. Rept. no. noltr-65-169
Proj. R360-FR-105/R011-01-01
Unclassified report

Descriptors: (*Operators (Mathematics), Spin), (*Matrix algebra, Operators (Mathematics)), Momentum, Perturbation theory, Crystal lattices

Matrix elements and partial traces have been calculated for products of pairs of components of two commuting vector angular momentum operators. (Author)

AD-624 182 Fld. 12/1, 9/5
NORTHWESTERN UNIV EVANSTON ILL DEPT OF ELECTRICAL ENGINEERING
ON THE DEGREES OF THE VERTICES OF A DIRECTED GRAPH,
by S. L. Hakimi. 1965, 20p. Contract DA-ARO (D)-31-124-G223 AROD 3298:5
Unclassified report

See also AD-267 092.

Availability: Published in Journal of the Franklin Institute V279 N4 P290-308 Apr 1965. Copies to DDC users only.

Descriptors: (*Number theory, Mathematical logic), (*Graphics, Theory), Electrical networks, Linear programming, Set theory, Topology

In a previous paper the realizability of a finite set of positive integers as the degrees of the vertices of a linear graph was discussed. Here the author is concerned with the realizability of a finite set of pairs of non-negative integers as the degrees of the vertices of a directed graph. The directed graphs considered in this paper are allowed to have parallel elements but it is assumed to contain no self-loop elements. The integers specify the number of arrowheads directed toward and away from vertex respectively. Other related problems such as; realizability of a given set of non-negative integer pairs as a connected directed graph, strongly connected directed graph, and cycleless directed graph are discussed. The problem of orienting a given graph and the Runyon problem are also considered. (Author)

AD-624 186 Fld. 12/1
CALIFORNIA UNIV LOS ANGELES NUMERICAL ANALYSIS RESEARCH
FINDING ZEROS OF A POLYNOMIAL BY THE Q-D ALGORITHM.
Revised ed.,
by P, Henrici, and Bruce O. Watkins. Jun 65, 6p.
Contract DA-ARO (D)-31-124-G570 AROD 1210:114
Unclassified report

Revision of manuscript submitted Mar 65.

Availability: Published in Communications of the ACM V8 N9 P570-4 Sep 1965. Copies to DDC users only.

Descriptors: (*Polynomials, Algorithms), (*Algorithms, Polynomials), Number theory, Approximation (Mathematics), Numerical analysis

A method which finds simultaneously all the zeros of a polynomial, developed by H. Rutishauser, has been tested on a number of polynomials with real coefficients. This slowly converging method (the Quotient-Difference (Q-D) algorithm) provides starting values for a Newton or a Bairstow algorithm for more rapid convergence. Necessary and

797-128 O-66—4

sufficient conditions for the existence of the Q-D scheme are not completely known; however, failure may occur when zeros have equal, or nearly equal magnitudes. Success was achieved, in most of the cases tried, with the failures usually traceable to the equal magnitude difficulty. In some cases, computer roundoff may result in errors which spoil the scheme. Even if the Q-D algorithm does not give all the zeros, it will usually find a majority of them. (Author)

AD-624 192 Fld. 12/1
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF
PARALLELIZABILITY OF DYNAMICAL SYSTEMS,
by T. R. Jenkins, and W. E. Johnson. 26 Oct 64, 3p.
Unclassified report

Availability: Published in Monatshefte fur Mathematik (Austria) V69 N4 P323-5 1965. Copies to DDC users only.

Descriptors: (*Functional analysis, Topology), (*Topology, Functional analysis), Differential geometry

AD-624 206 Fld. 12/1
WASHINGTON UNIV SEATTLE
SYMMETRIC MEASURES ON CARTESIAN PRODUCTS,
by Edwin Hewitt, and L. J. Savage. 2 Mar 55, 33p. Contract NSF-G-607
Unclassified report

Prepared in cooperation with Chicago Univ., Ill.

Availability: Published in Transactions of the American Mathematical Society V80 N2 P470-501 Nov 1955.

Descriptors: (*Measure theory, Stochastic processes), (*Algebras, Measure theory), Distribution theory, Convex sets

AD-623 758 See Fld. 9/2

AD-623 850 See Fld. 20/10

AD-623 882 See Fld. 19/5

AD-623 884 See Fld. 12/2

AD-623 927 See Fld. 9/5

AD-623 954 See Fld. 9/4

AD-623 999 See Fld. 20/8

AD-624 014 See Fld. 6/5

AD-624 064 See Fld. 6/15

AD-624 086 See Fld. 20/6

AD-624 125 See Fld. 20/10

AD-624 156 See Fld. 9/4

AD-624 162 See Fld. 9/2

AD-624 236 See Fld. 8/8

AD-624 237 See Fld. 8/8

AD-624 238 See Fld. 8/8

12/2. OPERATIONS RESEARCH

AD-623 723 Fld. 12/2, 9/2
CFSTI Prices: HC $2.00 MF $0.50
SYSTEMS RESEARCH CENTER CASE INST OF TECH CLEVELAND OHIO
CONCERNING AN ALGEBRAIC THEORY OF SYSTEMS,
by Thomas G. Windeknecht. 1965, 35p. Rept. no. src-78-A-65-30
Contract Nonr-1141 (12)
Unclassified report

Descriptors: (*Algebra, Man-machine systems), Mathematical models, Theory, Automata, Computers, Differential equations, Difference equations, Input-output systems

There exists a definite trend in engineering to undertake the design and study of systems of increasing size and complexity. In this, there are encountered practical difficulties which suggest the need for a mathematical theory of systems possessing considerably greater generality and conceptual power than existing theories. It appears that such a general, unified theory of systems can be developed along definite algebraic lines. This is so because essentially all of the mathematical models being used for the study of systems of various kinds have a common abstract structure. The purpose of the presentation is to display this abstract structure in terms of an algebraic formalism, and to discuss the applicability of such theory as is developed around it. In particular, it is demonstrated that the proposed theory unifies and, through axiomatic development, subsumes automata theory, the theory of Turing machines, and the input-output theory of systems defined by sets of differential equations and difference equations. (Author)

AD-623 747 Fld. 12/2
CFSTI Prices: HC $2.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
ITERATIVE SOLUTION OF NONLINEAR OPTIMAL CONTROL PROBLEMS.
Technical summary rept.,
by J. B. Rosen. Jul 65, 45p. Rept. no. mrc-TSR-591
Contract DA-11-022-ORD-2059
Unclassified report

Descriptors: (*Optimization, Control), (*Nonlinear programming, Iterative methods), (*Iterative methods, Nonlinear programming), Nonlinear differential equations, Linear programming

The solution of nonlinear, state-constrained, discrete optimal control problems by mathematical programming methods is described. The iterative solution consists essentially of Newton's method with a convex (or linear) programming problem solved at each iteration. Global convergence of the iterative method is demonstrated provided a convexity and constraint set condition are both satisfied. The computational solution of nonlinear equation control problems makes use of a previously developed method for state-constrained linear equation problems. The solution method for nonlinear problems is illustrated by means of two numerical examples. (Author)

AD-623 751 Fld. 12/2
CFSTI Prices: HC $2.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
THEORY OF OPTIMUM DISCRETE TIME SERIES,
Technical summary rept.,
by H. Halkin, B. W. Jordan, E. Polak, and J. B. Rosen. Sep 65, 28p. Rept. no. mrc-TSR-601
Contract DA-11-022-ORD-2059
Unclassified report

Descriptors: (*Optimization, Control systems), Difference equations, Vector analysis, Matrix algebra, Time

Discrete time systems whose dynamics are represented by recursion relations in the form of finite difference equations are considered. In addition, the control vectors and state vectors may be subject to inequality constraints. The control vectors are to be determined so as to satisfy the constraints and obtain an optimum value for a given function of the control and state vectors. This report gives a maximum principle for this type of discrete problem, and shows its relationship to the Kuhn-Tucker conditions for a finite-dimensional optimization problem. (Author)

AD-623 830 Fld. 12/2, 13/8
CFSTI Prices: HC $1.00 MF $0.50
FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS
NON-PREEMPTIVE PRIORITIES IN MACHINE INTERFERENCE.
Technical rept.,
by Thomas L. Hebble. 15 Sep 65, 18p. Rept. no. fsu-Statistics-M90
Contract Nonr-988 (08) Proj. NR-042-004 ONR TR-17
Unclassified report

See also AD-605 555.

Descriptors: (*Machines, Maintenance), (*Queueing theory, Maintenance), (*Mathematical models, Maintenance), Quality control, Operations research, Stochastic processes

A model of machine interference is studied in which one repairman is assigned to maintain several batteries of machines with a finite number of machines in each battery. The model, which assumes non-preemptive priorities, random breakdowns and general repair time distributions, is closely analogous to the classical priority queueing model of Kesten and Runnenburg. A system of equations for the multivariate binomial moments of the number of machines working in each battery immediately after a repair is completed, is established and solved. (Author)

AD-623 884 Fld. 12/2, 12/1
CFSTI Prices: HC $4.00 MF $0.75
STANFORD UNIV CALIF INST FOR MATHEMATICAL STUDIES IN THE SOCIAL SCIENCES
EXTENSIONS OF THE TWO-ARMED BANDIT AND RELATED PROCESSES WITH ON-LINE EXPERIMENTATION.
Technical rept.,
by Kent Quisel. 15 Nov 65, 104p. Rept. no. tr-137
Contract Nonr-225 (50) Proj. NR-047-004
Unclassified report

Descriptors: (*Decision theory, Optimization), (*Dynamic programming, Decision theory), Game theory, Sampling, Statistical processes, Least squares method, Mathematical models, Decision making, Diagnosis, Economics, Queueing theory

Sequential decision problems are considered in which immediate payoffs are random with unknown means. Using prior knowledge, each decision is based on the prior expected payoff and the future value of information associated with the observed payoff. A fundamental theory is developed and used to extend the two-armed bandit model to multiple arms and setup costs or bonuses, assuming only two states of nature. Conjugate prior densities lead to a 'stay-on-the-winner' rule for bounded variables. A least-squares policy iteration method is developed for computation. Bounds on the optimal return function are derived for general stochastic dynamic programming problems. (Author)

AD-624 023 Fld. 12/2
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
THE QUEUE M/G/1 WITH THE SHORTEST REMAINING PROCESSING TIME DISCIPLINE,
by Linus E. Schrage, and Louis W. Miller. Nov 65, 28p. Rept. no. p-3263
Unclassified report

Descriptors: (*Queueing theory, Time studies), (*Time studies, Queueing theory), Operations research, Distribution theory, Integral transforms

A priority queueing model in which the processing times of jobs are known upon arrival and preemption without loss of time or processing already accomplished is studied. Priority is assigned to jobs according to the length of processing remaining with highest priority goint to the job with least processing left. A preemption will occur whenever the processing time of a newly arriving job is less than the remaining processing time of the job then in service. The Laplace-Stieltjes transforms of the waiting time and time-in-system distributions are obtained and comparisons with other queueing disciplines are made. (Author)

AD-624 131 Fld. 12/2
CFSTI PricesMF $0.50
COWLES FOUNDATION FOR RESEARCH IN ECONOMICS YALE UNIV NEW HAVEN CONN
SIMPLICIAL METHODS FOR QUADRATIC PROGRAMMING.
Technical rept.,
by C. van de Panne, and Andrew Whinston. 1965, 37p. Rept. no. cowles Foundation paper-231, TR-66-2
Contract Nonr-3055 (01) Proj. NR-047-0061

Unclassified report

Naval Research Logistics Quarterly v11 n4 p273-302 Dec 64.

Availability: Superintendent of Documents, GPO, Washington, D.C., 20402, $0.50, in D.210.12: 11/4.

Descriptors: (*Quadratic programming, Optimization)

The article is concerned with two closely related quadratic programming methods, the Simplex and the dual method of quadratic programming. Though a selfcontained exposition of both methods is given, the article is concentrated on proofs of convergence of these methods and the properties of the Simplex tableaux. (Author)

AD-624 138 Fld. 12/2, 9/2
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
USING LINEAR PROGRAMMING AS A SIMPLEX SUBROUTINE.
by R. J. Clasen. Nov 65, 34p. Rept. no. p-3267

Unclassified report

Descriptors: (*Linear programming, Control sequences), (*Control sequences, Linear programming), Compilers, Programming languages

This paper discusses the problems involved in using linear programming as a subroutine of a larger routine. Proposals are made for eliminating the tolerance selection problem, and for improving the accuracy of inversions. Sample programs are given in FORTRAN IV and in ALGOL. (Author)

AD-624 141 Fld. 12/2, 9/2
CFSTI Prices: HC $4.00 MF $0.75
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS DATA SCIENCES LAB
AN ALGORITHM FOR THE DEFORMATION METHOD OF QUADRATIC PROGRAMMING.
Physical and mathematical sciences research papers,
by Roger Even Bove. Sep 65, 113p. Rept. no. pmsrp-142
Proj. 5632 Task 563201
AFCRL 65-70

Unclassified report

See also AD-409 679.

Descriptors: (*Quadratic programming, Algorithms), (*Algorithms, Quadratic programming), Programming (Computers), Matrix algebra, Iterative methods, Operations research

The algorithm presented represents the Zahl deformation method for quadratic programming. It gives an explanation of a modified Iverson programming language.

AD-624 157 Fld. 12/2, 9/2, 18/9
CFSTI Prices: HC $5.00 MF $1.00
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
AN ADAPTIVE TECHNIQUE FOR ON-LINE STEADYSTATE OPTIMIZING CONTROL.
Doctoral thesis,
by James H. Burghart. Nov 65, 173p. Rept. no. afit-TR-65-13

Unclassified report

Descriptors: (*Optimization, Control), (*Adaptive systems, Control), (*Control, Algorithms), Mathematical prediction, Performance (Engineering), Probability, Programming (Computers), Nonlinear systems, Reactor control

An adaptive technique is developed for on-line steadystate optimizing control. The technique uses an approximate on-line control algorithm with adjustable parameters which are adapted to maximize expected system performance. The technique is applicable to the general multivariable nonlinear system. Convergence conditions for the adaptation technique are derived. Statistical techniques are applied to the problem of predicting the statistics of the system disturbance inputs which are generally nonstationary. Two approximate methods of implementing this technique are developed to ease the computational burden. The factors involved in designing a control system using this technique are discussed from the point of view of trying to maximize an overall system profit function; the function includes the cost of control.

AD-623 821 **See Fld. 17/7**

AD-623 825 **See Fld. 5/1**

13/1. AIR CONDITIONING, HEATING, LIGHTING, AND VENTILATING

AD-623 840 Fld. 13/1, 13/13
CFSTI Prices: HC $3.00 MF $0.75
FRANKLIN INST RESEARCH LABS PHILADELPHIA PA
MANUAL BLOWER DEVELOPMENT.
Final rept.,
by Geza Vermes, and George Peter Wachtell.
Sep 65, 77p. Rept. no. f-B1983
Contract OCD-OS-62-280 Proj. OCD-1400
Task 1430

Unclassified report

Descriptors: (*Fallout shelters, Ventilation), (*Ventilation fans, Fallout shelters), (*Blowers, Reciprocating pumps), Hand cranks, Valves, Tanks (Containers), Pistons, Stress physiology, Life support, Environment, Thermal properties, Mechanical drawings, Design

The report presents the method of selecting a suitable blower type for manual drive; describes the experimental and theoretical investigations which led to the development of three key components (valves, piston and surge-tank). Results of tests are analyzed that show the blower having more than 65% total efficiency and a stiff pressure vs volume curve. Design for mass production is suggested; calculation of components for the mass produced version is explained so that the mass produced blower should at least be as efficient as the test-version described in this report. (Author)

AD-624 147 Fld. 13/1, 20/13
CFSTI Prices: HC $3.00 MF $0.75
RENSSELAER POLYTECHNIC INST TROY N Y
A COMPARATIVE STUDY OF STEADY AND NONSTEADY-FLOW ENERGY SEPARATORS.
Master's thesis,
by Joseph S. Hashem. Oct 65, 63p. Rept. no. tr-AE-6504
Contract DA-31-124-ARO (D)-318 Proj. DA-20014501B33G AROD 5641:1

Unclassified report

Descriptors: (*Energy management, Hilsch tubes), (*Hilsch tubes, Compressible flow), (*Energy, Separation), Performance (Engineering), Cooling + ventilating equipment

This paper analyzes and compares two methods of energy separation -- a steady-flow method proposed by Ranque over thirty years ago and a nonsteady-flow method recently proposed and studied by Foa. Part I of the paper develops a simple theory for devices utilizing the first method (Ranque tubes). Despite its simplicity and extreme idealization, the theory appears to provide better agreement with experimental data than any of the available analytical treatments. Part II is an extension of the Foa theory of the non-steady-flow energy separator. The extension is more idealized than the original theory but covers a wider variety of embodiments of the concept. A comparison is also given between the performance characteristics of steady-flow and non-steady-flow energy separators. Part III defines a coefficient of performance for the two devices as refrigerators or air conditioners, and compares these coefficients with those of standard refrigerating cycles. (Author)

AD-624 124 **See Fld. 22/2**

13/2. CIVIL ENGINEERING

AD-623 772 Fld. 13/2
CFSTI Prices: HC $2.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
A DIGITAL SIMULATION MODEL OF A FREEWAY DIAMOND INTERCHANGE.
Professional paper,
by E. Hayes. 26 Oct 65, 32p. Rept. no. sp-2228/000/00

Unclassified report

Descriptors: (*Roads, Geometric forms), Digital computers, Models (Simulations)

The Vehicular Traffic Study Project has developed a digital computer simulation model of a portion of a freeway diamond interchange. The total model will be designed for conducting research promoting the improvement of the geometric designs of freeway interchanges and for the development of effective control devices regulating traffic flow through them. Included is an outline of the four phases of the study being conducted, and a description of the first phase, or Model 1, which has been formulated and coded for a digital computer. The programming components of Model 1 are given, together with the various outputs produced by the data reduction routines. The paper concludes with an indication of the future directions to be taken in this study. (Author)

AD-623 952 Fld. 13/2, 13/6
CFSTI Prices: HC $3.00 MF $0.75
BOEING CO MORTON PA VERTOL DIV
FEASIBILITY STUDY OF ON-SITE FABRICATED BEACH MATTING.
Rept. for May-Sep 65.
Nov 65, 78p. Rept. no. d6-57118
Contract NOm-73258

Unclassified report

Descriptors: (*Beaches, Trafficability), (*Soils, Binders), Landing mats, Amphibious operations, Polyester plastics, Isocyanate plastics, Epoxy plastics, Road-building equipment, Sand, Feasibility studies, Glass textiles

The on-site fabrication of beach matting using plastic resins and other lightweight materials was investigated. It was assumed that rapid curing materials could be sprayed or poured over sand, resulting in a surfacing of sufficient strength to allow the passage of heavy vehicles. Materials were sought which had desirable characteristics such as rapid curing under wide temperature and moisture conditions, low cost, low toxicity, high strength-to-weight ratio, easy application, and extended storage life. Fortythree materials were evaluated. Materials which did not cure within a prescribed 3-hour limit were eliminated from further structural testing. Twenty materials were subjected to small-scale structural testing. Of these materials, three polyester resins, one epoxy resing, and one polyurethane foam exhibited the highest strength characteristics. Static wheel-load tests of 10,000 pounds and 70 psi tire pressure, simulating the heaviest Marine wheeled vehicle to travel on matting, were performed on 3 by 5 foot specimens and the following results were obtained: (a) all polyester specimens reinforced with 17 to 35 percent chopped fiberglass withstood the 10,000 pound wheel load. (b) epoxy specimens reinforced with 19 to 32 percent chopped fiberglass withstood the 10,000 pound wheel load. (c) one polyurethane foam specimen with an 18 pound per cubic foot density and an average thickness of 1 inch failed at a 3700 pound wheel loading.

AD-623 997 Fld. 13/2, 1/5
CFSTI Prices: HC $1.50 MF $0.75
OHIO RIVER DIV LABS MARIEMONT
INVESTIGATION OF CONCRETE PAVEMENTS ON DIFFERENT SUBGRADES.
Final rept.
Jan 46, 79p.

Unclassified report

Descriptors: (*Pavements, Foundations (Structures)), (*Runways, Pavements), Performance (Engineering), Tests, Failure (Mechanics), Trafficability, Loading (Mechanics), Civil engineering, Experimental data, Mathematical analysis

The strengths of full size concrete airfield pavements were tested under static plate loads and under moving pneumatic tire wheel loads. In seeking to ascertain the effects in highly stressed concrete caused by occasional heavy wheel loads as normally characteristic of traffic on runways, the tests were carried to complete failure of the concrete. The slabs tested were 5, 6, 7, 8, and 10 inches thick; 12.5 feet and 20 feet wide and all were 20 feet long with the exception of the apron series in which the slabs were 45 feet long. All slabs were of plain concrete except those of the apron which were lightly reinforced. Test data and results are given.

AD-624 146 Fld. 13/2
CFSTI Prices: HC $3.00 MF $0.75
BUREAU OF RECLAMATION DENVER COLO
HYDRAULIC MODEL STUDIES OF SURGES DEVELOPED BY REJECTION OF FLOW AT THE FOREBAY PUMPING PLANT, SAN LUIS UNIT CENTRAL VALLEY PROJECT, CALIFORNIA.
1 Nov 65, 68p. Rept. no. hyd-546

Unclassified report

Descriptors: (*Inland waterways, Hydraulic models), (*Water waves, Inland waterways), Model tests, Fluid dynamic properties, Fluid flow, Damping, Hydrodynamic configurations, Pumps, Surface properties, Viscosity

Data from a 1:48 scale model supplied the magnitudes and velocities of surges developed in the canal system following rejection of flow at the pumping plant, San Luis Forebay, California, and showed that a side weir was effective in reducing the surges. Data were obtained with capacitance wave probes for partial and complete rejection of flow with and without backflow from the pump discharge lines. Maximum surge peak heights were 5.4 ft for complete rejection of the maximum discharge plus 200% backflow, 4.5 ft with 150% backflow, and 1.9 ft without backflow. Velocities of propagation were 20.7, 20.7, and 19.1 fps, respectively, for the 3 conditions. A 1,500 ft-long weir on the canal sideslope reduced the maximum surge height to 1.0 ft without backflow and 1.3 ft with either 150 or 200% backflow. The reflecting and attenuating characteristics of canal structures were observed and steady-state conditions after flow rejection with the entire flow discharging over the weir were measured. The undular form of the surge wave was analyzed and several comparisons were made with theory. A 1:10 scale section model was used to develop the weir crest shape. (Author)

AD-623 881 **See Fld. 8/12**

AD-623 966 **See Fld. 6/11**

AD-624 004 **See Fld. 2/4**

AD-624 122 **See Fld. 8/8**

13/6. GROUND TRANSPORTATION EQUIPMENT

AD-623 952 **See Fld. 13/2**

AD-623 953 **See Fld. 1/5**

13/7. HYDRAULIC AND PNEUMATIC EQUIPMENT

AD-623 911 Fld. 13/7
CFSTI Prices: HC $4.00 MF $0.75
UNITED AIRCRAFT CORP EAST HARTFORD CONN RESEARCH LABS
FLUID AMPLIFICATION: 17. STUDIES OF REATTACHING JET FLOWS IN FLUID-STATE WALL-ATTACHMENT DEVICES,
by R. E. Olson, and Y. T. Chin. 30 Sep 65, 105p.
Contract DA-49-186-AMC-144 (D) Proj. DA-1P010501A001 ,HDL-31100

Unclassified report

Descriptors: (*Fluid amplifiers, Jets), (*Jets, Fluid amplifiers), Digital systems, Subsonic flow, Supersonic flow, Control systems, Walls, Configuration, Performance (Engineering), Experimental data

Analytical and experimental studies were conducted to provide information regarding the characteristics of power jet reattachment in wall-attachment digital amplifiers. The experimental studies included investigations of the effect of control flow on the power jet reattachment location for both single- and double-boundary-wall configurations having various wall lengths and the spreading rate of the jet boundary enclosing the separation bubble for single-boundary-wall configurations. These studies were conducted for both subsonic and supersonic jet Mach numbers. The analytical studies included an investigation of techniques for predicting the effect of control flow on the power jet reattachment location for single-boundarywall configurations having a boundary wall of infinite length. An empirical correlation of the experimental results obtained for the infinite length, single-boundarywall configurations is presented from which the effect of control flow on the reattachment location can be estimated. Also presented is a generalization of the effect of terminating the boundary wall.

AD-624 091 Fld. 13/7, 21/5
CFSTI Prices: HC $6.00 MF $1.50
MASSACHUSETTS INST OF TECH CAMBRIDGE ENGINEERING PROJECTS LAB
RESEARCH AND DEVELOPMENT OF FLUID AMPLIFIERS FOR TURBOPROPULSION SYSTEM CONTROL.
Final rept.
30 Jun 64, 277p. Rept. no. dsr-9159-2
Contract AF33 (657)-8384 Proj. AF-3066 Task 306603
APL TDR-64-82

Unclassified report

See also AD-432 133.

Descriptors: (*Fluid amplifiers, Warning systems), (*Warning systems, Jet engines), Pressure, Jets, Deflection, Dynamics, Temperature warning systems, Stall-warning indicators, Pneumatic devices, Control systems, Fluid flow, Oscillation, Fluid mechanics

Techniques for sensing the relative threat of flow instabilities in jet engines have been a long soughtafter goal. This is the final report of a study aimed at determining the feasibility of certain types of fluid jet amplifiers used as fast pressure and temperature sensors. The more theoretical aspects of the report include a study of the statics and dynamics of the interaction of a fluid jet and a receiver port, the dynamics of the controlled deflections of jets in fluid amplifiers, and the dynamic analysis of fluid systems. The more applied aspects include the design of a fluidrelay stall-cell sensor, a fluid diode possibly useful for sensing blade wakes or stall cells, and a unique reference-frequency pneumatic oscillator. (Author)

AD-624 097 Fld. 13/7
CFSTI Prices: HC $6.00 MF $1.25
HARRY DIAMOND LABS WASHINGTON DC
PROCEEDINGS OF THE FLUID AMPLIFICATION SYMPOSIUM, 26, 27, AND 28 OCTOBER 1965. VOLUME IV.
1965, 292p.

Unclassified report

See also AD-623 457, AD-623 456, AD-623 455.

Descriptors: (*Fluid amplifiers, Symposia), (*Symposia, Fluid amplifiers), Jets, Numerical analysis, Sound, Helium, Air, Reynolds number, Turbulence, Pneumatic valves, Pressure regulators, Computer logic, Oscillation, Fluid flow, Thrust vector control systems, Control systems, Nozzles, Stability, Coanda effect

Contents: The analysis of submerged jet flow fields by a numerical field computation method, Schlieren observations of the effect of sound injected into the power nozzle of a helium-into-air jet, the effect of sound on a reattaching jet at low Reynolds numbers, Transition to turbulence and wall attachment of miniature jets, an experimental study of the static interaction of an axisymmetrical fluid jet and a single receiver-diffuser, dynamic interaction of a fluid jet and a receiver load system, Transient theory of switching in a bistable valve, flueric pressure regulation using a resistance set point, a flueric induction and gate, mechanically entrained fluidic oscillator, steady flow in a pure fluid valve TVC system, experimental study of fluid controlled valves, experimental investigation of the performance characteristics of a flow-instability sensing device.

AD-623 998 **See Fld. 20/4**

13/8. INDUSTRIAL PROCESSES

AD-623 835 Fld. 13/8, 14/2
CFSTI Prices: HC $1.00 MF $0.50
ARMY MATERIALS RESEARCH AGENCY WATERTOWN MASS MATERIALS ENGINEERING DIV
SEMICONDUCTOR TRANSDUCERS FOR ULTRASONIC TESTING.
Technical rept.,
by Otto R. Gericke. Sep 65, 23p. Rept. no. amra-TR-65-21
Proj. PEMA 15021

Unclassified report

Descriptors: (*Transducers, Semiconductor devices), (*Semiconductor devices, Transducers), (*Ultrasonic radiation, Test equipment), Crystals, Germanium, Silicon, Effectiveness, Sensitivity, Probes, Diodes (Semiconductor), Capacitance

A new type of ultrasonic transducer is discussed which employs a semiconductor crystal as the active element. Experiments are reported in which germanium and silicon crystals were used as transmitters and receivers of ultrasonic signals. The sensitivity of the semiconductor transducer is compared with piezoelectric transducers and ordinary capacitive probes employed under identical conditions. The semiconductor transducer is found to have a lower sensitivity than the piezoelectric transducer but it offers the advantages that it does not require a couplant and can be provided with a sharp point to permit testing on very rough surfaces. (Author)

AD-623 716 See Fld. 9/1

AD-623 717 See Fld. 9/1

AD-623 727 See Fld. 14/5

AD-623 730 See Fld. 10/1

AD-623 830 See Fld. 12/2

AD-623 879 See Fld. 11/5

AD-623 880 See Fld. 11/5

AD-623 888 See Fld. 11/5

AD-623 889 See Fld. 11/5

AD-623 891 See Fld. 11/5

AD-623 892 See Fld. 11/5

AD-623 893 See Fld. 11/5

AD-623 992 See Fld. 11/3

AD-624 153 See Fld. 9/1

AD-624 167 See Fld. 13/9

AD-624 207 See Fld. 17/5

AD-624 208 See Fld. 17/5

13/9. MACHINERY AND TOOLS

AD-624 167 Fld. 13/9, 13/8
CFSTI Prices: HC $2.00 MF $0.50
AUTONETICS ANAHEIM CALIF
DEEP-WATER METAL-CUTTING TORCH.
Final rept., phase 1.
1963, 44p. Rept. no. C5-2121/32
Contract NObs-92585 Proj. SR007-09-04 Task 875

Unclassified report

Descriptors: (*Torches, Underwater cutting), Metal plates, Steel, Corrosion, Toxicity, Liquids, Oxidizers, Fuels, Hazards, Amonium compounds, Methanols, Ethanols, Hydrazine, Chlorine compounds, Fluorides

The feasibility of the liquid oxidant-fuel concept for use in an underwater cutting torch application was demonstrated by achieving an underwater cut of steel plates. Tests were also conducted to evaluate corrosivity effects in the immediate vicinity of the experimental cutting operations. The toxicity of potential fuels and oxidants was investigated. Other existing and potential cutting techniques were reviewed and are discussed.

AD-624 082 See Fld. 14/2

13/10. MARINE ENGINEERING

AD-623 711 Fld. 13/10, 20/4
CALIFORNIA INST OF TECH PASADENA HYDRODYNAMICS LAB
EXPERIMENTAL OBSERVATIONS ON THE FLOW PAST A PLANO-CONVEX HYDROFOIL,
by R. B. Wade, and A. J. Acosta. Feb 65, 12p.
Rept. no. e-79.8
Contract Nonr-220 (24) Proj. NR-062-010

Unclassified report

Availability: Published in transactions of the ASME Journal of Engineering for Power P1-10 165. Copies to DDC users only.

Descriptors: (*Hydrofiols, Fluid flow), (*Cavitation, Hydrofoils), Oscillation, Angle of attack, Geometric forms, Frequency, Convex bodies, Fluid dynamic properties

Some new measurements and observations on the noncavitating and cavitating flow past a plano-convex hydrofoil are presented. Under some conditions of partial cavitation, strong, periodic oscillations both in the cavity length and forces exerted on the hydrofoil are observed. The reduced frequency of oscillation depends upon the cavitation number and angle of attack; it also depends somewhat on tunnel speed for the lower angles of attack but becomes substantially independent of speed for the highest angle. The peak-to-peak magnitude of the force oscillation can amount to about 20 percent of the average force. (Author)

AD-623 762 Fld. 13/10
CFSTI Prices: HC $2.00 MF $0.50
WIGLEY (C) LONDON (ENGLAND)
THE TRIM OF A SHIP IN SHALLOW WATER,
by C. Wigley. May 65, 27p. Contract N62558-4085 Task 062-211

Unclassified report

Descriptors: (*Ships, Moments), Numerical analysis, Functions, Pressure, Great Britain, Water waves

The trim of a ship is analyzed mathematically, the results are applied to two simple forms, and some approximate numerical integrations of these forms are made.

AD-623 937 Fld. 13/10
CFSTI Prices: HC $2.00 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C HYDROMECHANICS LAB
WAKE ANALYSIS OF SHIP MODELS TWIN-SCREW MERCHANT TYPES,
by H. M. Cheng, and J. B. Hadler. Oct 65, 48p.
Proj. S-R011-01-01 Task 0401
DTMB 2074

Unclassified report

Descriptors: (*Merchant vessels, Wake), (*Ship models, Merchant vessels), Propellers (Marine), Mathematical analysis, Digital computers, Cavitation, Vibration, Velocity, Model tests

The report presents the results of the wake of twin-screw merchant-type ship models using the IBM-7090 computer. The data presented are the interpolated longitudinal and tangential velocity distributions, their computer mean values, the harmonic contents of these velocity components, the maximum variations in the resultant inflow velocity, and the advance angles and their variations. Also included are the calculated volumetric wake velocities. (Author)

AD-623 959 Fld. 13/10, 8/3, 13/13
CFSTI Prices: HC $5.00 MF $1.00
GM DEFENSE RESEARCH LABS SANTA BARBARA CALIF SEA OPERATIONS DEPT
THE DYNAMICS OF SIMPLE DEEP-SEA BUOY MOORING.
Finial rept., May 64-Nov 65,
by Robert G. Paquette, and Bion E. Henderson.
Nov 65, 182p. Rept. no. tr-65-79
Contract Nonr-4558 (00) Proj. NR-083-196

Unclassified report

Descriptors: (*Mooring, Buoys), (*Dynamics, Mooring), (*Cables (Mechanical), Anchors (Marine)), Ocean currents, Drag, Underwater, Water waves, Velocity, Nylon, Steel, Tensile properties, Oceanology, Simulation, Analog computers

The dynamics of buoy mooring ropes under conditions typical of the open sea were simulated in an analog computer. Motions sufficient to cause significant errors in current meters were found in the ropes. Dynamic tensions rising to dangerous values were found in short, taut, steel ropes. Lesser tensions were found in nylon ropes. Rope shapes in ocean currents varying with depth also were obtained incidental to the principal study. (Author)

AD-624 056 Fld. 13/10
CFSTI Prices: HC $3.00 MF $0.75
CALIFORNIA UNIV BERKELEY INST OF ENGINEERING RESEARCH
TWO-BEAM DECKHOUSE THEORY WITH SHEAR EFFECTS,
by H. A. Schade. Oct 65, 70p. Rept. no. na-65-3
Contract NObs-90187 Proj. SF-013-03-01 Task 1977

Unclassified report

Descriptors: (*Ship hulls, Shear stresses), (*Ship decks, Loading (Mechanics)), Theory, Numerical analysis, Differential equations

The paper deals with the structural response in vertical bending and shear, of the upright ship hull with a deckhouse. The basis for the analysis is that of considering each component as a thin-walled Navier beam and accounting for (a) vertical loading of the deckhouse by a foundation modulus 'k' in the usual manner; (b) vertical shear deflection of each component in addition to bending deflection; (c) non-equality of longitudinal strain at deck-edge and deckhouse connection by applying shear lag theory to the deck. The superstructure is handled as a special case, with only (b) above being applicable. Design charts are presented, based on the solution to the differential equation, for computing (1) longitudinal stresses at midlength, (2) shear flow at bond, and (3) differential deflection of the two components. It is indicated that the three items (a), (b) and (c) may be of the same order of importance. A few preliminary experimental results are included. (Author)

AD-624 155 Fld. 13/10
CFSTI Prices: HC $3.00 MF $0.75
OCEANICS INC PLAINVIEW N Y
A PRELIMINARY STUDY OF PREDICTION TECHNIQUES FOR AIRCRAFT CARRIER MOTIONS AT SEA.
Rept. no. 4, 1 Apr 64-31 Mar 65,
by Paul Kaplan. Oct 65, 73p. Rept. no. oceanics-65-23
Contract Nonr-4186 (00) Proj. RR-011-05-04

Unclassified report

See also AD-620 869.

Descriptors: (*Aircraft carriers, Motion), Mathematical prediction, Carrier landings, Functions, Statistical analysis, Determinants, Water waves, Fluid dynamic properties

Mathematical techniques for calculating ship motion time histories are developed for application to the aircraft carrier landing operation. Various methods for short-term prediction of motion time history are considered, based on both deterministic and statistical techniques. The most attractive approach for prediction purposes is the deterministic technique based on a convolution integral representation, with wave height measurements at the bow serving as the input data. A kernel-type weighting function, which operates on the input

to provide the predicted motion history, is derived from ship response functions, and is shown to yield good pitch prediction up to 6 seconds ahead. The limitations of classical statistical prediction techniques, as well as practical implementation difficulties, are exhibited. Certain aspects of recent prediction theory developments are considered for a proposed hybrid prediction technique (i.e. containing elements of both deterministic and statistical approaches) that will be compatible with the envisioned digital format of the predictor, and which will increase the prediction time. (Author)

AD-624 203 Fld. 13/10
CFSTI Prices: HC $3.00 MF $0.75
DAVID TAYLOR MODEL BASIN WASHINGTON D C
WAKE ANALYSIS OF A SERIES 60, 0.60 BLOCK COEFFICIENT MODEL, MODEL 4210-5.
Final rept.,
by J. B. Hadler, and A. H. Weaver. Oct 65, 70p.
Rept. no. 2075
Proj. S-R009-01-01 Task 0103
Unclassified report

Descriptors: (*Wake, Ship models), (*Propellers (Marine), Wake), (*Cargo ships, Design), Velocity, Harmonic analysis, Marine rudders, Ship hulls, Configuration

The report presents the results of the wake analysis of a single-screw Series 60 model having a block coefficient of 0.60. The data presented include the interpolated longitudinal and tangential velocity distributions, and the effect on wake harmonics due to variations in speed, longitudinal position of rudder and plane of survey, draft, and trim. (Author)

AD-623 898 **See Fld. 14/2**

AD-623 991 **See Fld. 20/4**

AD-624 216 **See Fld. 10/2**

13/13. STRUCTURAL ENGINEERING

AD-623 719 **See Fld. 18/3**

AD-623 720 **See Fld. 18/3**

AD-623 840 **See Fld. 13/1**

AD-623 881 **See Fld. 8/12**

AD-623 958 **See Fld. 20/11**

AD-623 959 **See Fld. 13/10**

14/1. COST EFFECTIVENESS

AD-623 825 **See Fld. 5/1**

14/2. LABORATORIES, TEST FACILITIES, AND TEST EQUIPMENT

AD-623 873 Fld. 14/2, 20/11, 20/6
CFSTI Prices: HC $1.00 MF $0.50
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH
A SCATTERED LIGHT PHOTOELASTIC METHOD FOR INVESTIGATING STRESSES IN AXIALLY SYMMETRIC PROBLEMS UNDER LIVE LOADS,
by Y. F. Cheng. 1965, 17p. Rept. no. d1-82-0458
Unclassified report

Presented at the Midwestern Mechanics Conference (9th), Madison, Wis., 16-8 Aug 65. Also available from the author.

Descriptors: (*Stresses, Analysis), (*Photoelasticity, Test methods), (*Polariscopes, Stresses), Disks, Loading (Mechanics), Nondestructive testing, Light, Scattering, Shear stresses

A scattered light photoelastic method for investigating stresses in axially symmetric problems at room temperature under live loads is described. Using this method, observations are required in only one plane. A scattered light polariscope using a Helium-Neon continuous wave gas laser as the light source was designed and assembled. The stresses in a simply-supported thick circular plate having a free span diameter of 3-in and a thickness of 1-in subjected to a concentrated load at the center were studied. Complete stress distributions were given for two concentric cylindrical sections with radii of 0.3 and 0.84 inches respectively. (Author)

AD-623 874 Fld. 14/2, 20/11, 20/6
CFSTI Prices: HC $1.00 MF $0.50
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH
A DUAL-OBSERVATION METHOD FOR DETERMINING PHOTOELASTIC PARAMETERS IN SCATTERED LIGHT,
by Y. F. Cheng. 1965, 25p. Rept. no. d1-82-0468
Unclassified report

Presented at the International Congress on Experimental Mechanics (2nd), Washington, D. C., 28 Sep-1 Oct 65. Also available from the author.

Descriptors: (*Photoelasticity, Test methods), (*Stresses, Analysis), Light, Scattering, Nondestructive testing, Structural parts, Polarization

A dual-observation method is developed for determining photoelastic parameters of objects in scattered light. Using this method, the intensities of scattered light along two directions of observation, making an angle of 45degrees in a plane normal to the beam, are recorded simultaneously without rotation of either the beam or the model. Photoelastic parameters are evaluated from these records. The theory of the method, the apparatus and techniques, as well as illustrative experiment are reported. (Author)

AD-623 898 Fld. 14/2, 13/10, 21/8
CFSTI Prices: HC $3.00 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C
EXCITATION OF SIMPLE STRUCTURES WITH SMALL ROCKET MOTORS,
by John G. Viner. Oct 65, 52p. Rept. no. 2021
Proj. S-F013-01-13 Task 11274
Unclassified report

Descriptors: (*Vibration, Test methods), (*Rocket motors, Test equipment), (*Ship structural components, Vibration), Beams (Structural), Damping, Experimental data

Small rocket units were fired on a test beam in air and for the first time under water. Natural frequencies, mode shapes, and modal damping values were obtained from the resultant transient data. Steady-state tests were made on the test beam to provide a means of evaluating the results of the rocket tests. Natural frequencies obtained from the rocket tests agreed with steady-state test results within 6 percent. Relative amplitudes between accelerometers at the same filtered frequency obtained from the rocket tests and the steadystate tests were in good agreement. These tests are the first results of a program to investigate the feasibility of using impulsive excitation to determine the vibratory characteristics of naval structures. Further developmental work is required to overcome difficulties experienced in these tests and to develop techniques to identify the vibratory characteristics of larger and more complex structures. (Author)

AD-623 935 Fld. 14/2, 17/7
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE MISSILE DEVELOPMENT CENTER HOLLOMAN AFB N MEX
TRACK TESTING TECHNIQUES OF INERTIAL GUIDANCE SYSTEMS,
by Gerhard W. Braun. May 61, 39p. Rept. no. afmdc-TR-61-14
Unclassified report

Descriptors: (*Tracks (Aerodynamics), Inertial guidance), (*Inertial guidance, Test methods), Data, Collimators, Velocity, Measurement, Stabilized platforms, Supersonic test vehicles, Test equipment

Equipment and evaluation procedures are described which facilitate speed measurement of a supersonic sled during the important part of the run with a bias error of less than one part in 40,000. This accuracy together with angular position monitoring of the stabilized platform by means of photo autocollimators offers a possibility for experimental determination of the systematic errors of an inertial guidance system under realistic operational conditions. (Author)

AD-624 082 Fld. 14/2, 13/9, 19/1
CFSTI Prices: HC $1.00 MF $0.50
HARRY DIAMOND LABS WASHINGTON D C
DEVICE FOR MEASUREMENT OF ENDPLAY OF CONICAL PIVOTS,
by Lyndon S. Cox. 24 Sep 65, 16p. Rept. no. tm-65-31
Proj. DA-1C543312D41414 ,HDL-54000
Unclassified report

Descriptors: (*Meters, Tolerances (Mechanics)), (*Tolerances (Mechanics), Measurement), Jewel bearings, Supports, Motion, Instrumentation, Conical bodies, Calibration

The report describes a device that measures endplay between a conical pivot and its jewel bearings. This measurement is accomplished by movement of a mechanical lever, which is then magnified by an optical system. Measurements can be made with contact forces as low as 100 dynes. Endplay up to 0.002 in. can be measured within =0.000025 in. or 5 percent, whichever is greater. (Author)

AD-624 085 Fld. 14/2
CFSTI Prices: HC $2.00 MF $0.50
HARRY DIAMOND LABS WASHINGTON D C
A PIEZORESISTIVE SHOCK-PRESSURE TRANSDUCER,
by P. S. Brody, and A. P. Raiche. 30 Aug 65, 35p. Rept. no. tr-1303
Proj. DA-1P014501B11A ,HDL-38100
Unclassified report

Descriptors: (*Pressure gages, Shock waves), (*Piezoelectric transducers, Pressure gages), (*Shock waves, Measurement), Pressure, Copper alloys, Manganese alloys, Nickel alloys, Embedding substances, Glass textiles, Epoxy plastics, Resistance (Electrical)

A shock-pressure spiral transducer has been fabricated and determined capable of measuring 30 kilobars or less shock pressure to =6 percent. A spiral of manganin is imbedded in a Plexiglas or epoxy matrix that is oriented so that the plane of the spiral is parallel to that of a shock front, which is generated in the matrix by gas-gun accelerated metal plates. When the spiral carries a constant current, a voltage change proportional to the time-dependent pressure occurs as a result of the resistance change caused by the piezoresistive nature of manganin. The voltage outputs produced in tests utilizing 30-kilo-bar pressure steps verify the calculated response time of approximately 10 to the minus 7th power sec and yield an effective piezoresistive coefficient for shock pressures in Plexiglas of 2.85 = 0.00017 ohms/ohm kilobar. The deviation is a measure of the spread from transducer to transducer. This report describes the imbed-

ding procedure, circuits for measuring the resistance change, the calculated theoretical response of the transducer, the method used to produce the shock waves, and the experimental results obtained in shock-wave measurements. (Author)

AD-624 222 Fld. 14/2
CFSTI Prices: HC $1.00 MF $0.50
NEW YORK UNIV N Y SCHOOL OF ENGINEERING AND SCIENCE
COMMERCIAL-MILITARY FLUX AND GAUSSMETERS,
May 61, 15p. Rept. no. sete-210/50
Proj. SETE

Unclassified report

Descriptors: (*Fluxmeters, Catalogs), (*Magnetometers, Catalogs), Specifications

Table of Contents: Coded symbols used for manufacturers' names, Definitions of operating principles, Commercial gaussmeters, Commercial fluxmeters, Military gaussmeters, Military fluxmeters.

AD-624 228 Fld. 14/2, 9/3
CFSTI Prices: HC $3.00 MF $0.75
NEW YORK UNIV N Y SCHOOL OF ENGINEERING AND SCIENCE
MICROWAVE MEASUREMENTS OF ADMITTANCE, IMPEDANCE AND TRANSFER FUNCTION PARAMETERS,
by Jack Lustig. Mar 65, 86p. Rept. no. sete-210-84
Contract NObsr-89288 Proj. SETE ,SF-0131701 Task 5599

Unclassified report

Descriptors: (*Measuring devices (Electrical + electronic), Microwave equipment), (*Microwave equipment, Measuring devices (Electrical + electronic)), Functions, Admittance, Electrical impedance

The purpose of this report was to present in a summary manner the measurement of microwave impedance, admittance and transfer function characteristics. The manufacture of these systems on a commercial basis, at present, is limited to a handful of companies. Therefore, in order to make the report more meaningful the format was broadened to include theory, published articles, prototype developments and patent information.

AD-624 229 Fld. 14/2, 16/1
CFSTI Prices: HC $4.00 MF $1.00
NEW YORK UNIV N Y SCHOOL OF ENGINEERING AND SCIENCE
AUTOMATIC TEST EQUIPMENT FOR SYSTEMS CHECKOUT,
by Daniel J. Seaman. May 65, 142p. Rept. no. sete-210/85
Contract NObsr-89288 Proj. SETE ,SF-0131701 Task 5599

Unclassified report

Descriptors: (*Test sets, Automatic), (*Systems engineering, Test sets), (*Checkout equipment, System engineering), Guided missiles, Amplifiers, Maintenance equipment, Weapons systems, Computers, Flight control systems, Data, Catalogs

AD-624 232 Fld. 14/2
CFSTI Prices: HC $1.00 MF $0.50
NEW YORK UNIV N Y SCHOOL OF ENGINEERING AND SCIENCE
ENVIRONMENTAL NOMENCLATURE SYSTEM FOR ELECTRONIC TEST EQUIPMENT.
May 63, 9p. Rept. no. sete-228/5
Proj. SETE

Unclassified report

Descriptors: (*Test equipment, Classification), Electronic equipment, Environmental tests, Test equipment (Electronics), Test sets

The report sets forth a nomenclature system for electronic test equipment based upon a set of environmental groupings or classes which apply to portable (and transportable) electronic test equipment. This report is also intended to define primary and secondary lettertype designators which define the different environmental classes. This nomenclature system is not intended to cover the detailed requirements for test equipment which is built into a prime equipment. In such a case, the governing prime equipment specification prevails.

AD-624 233 Fld. 14/2
CFSTI Prices: HC $2.00 MF $0.50
NEW YORK UNIV N Y SCHOOL OF ENGINEERING AND SCIENCE
THE SYNERGISTIC EFFECT IN ENVIRONMENTAL TESTING,
by Walter J. Kiernan. Sep 65, 39p. Rept. no. sete-228/7
Contract NObsr-89288 Proj. SETE ,SF-0131701 Task 5599

Unclassified report

Descriptors: (*Environmental tests, Test methods), Test equipment, Electronic equipment, Multiple operation, Space environmental conditions, Seas, Flight, Test facilities, Controlled atmospheres

The evidence in this report clearly indicates that test equipment, whether in transit, in storage, on board a moving vehicle, or in a fixed location is often subjected simultaneously, to many environmental stresses whose combined action on a particular instrument is presently unpredictable. An examination of the available combined commercial test facilities demonstrates that few organizations can provide wide range combined environments. Most of the commercial companies limit themselves to standard groupings (i.e., temperature-humidity, temperature-altitude, etc.). Government facilities as a rule place greater emphasis on combined environmental testing. Yet even on extensive government installations the testing often is confined to narrow objectives. The cost factor has frequently proven to be a major stumbling block in enlarging the scope of synergistic testing and must continue to be weighed against the advantages gained by introducing more complex test environments. The instant investigation has uncovered only three studies concerning the multienvironmental effects on electronic equipment. The results of these studies, however, were not positive and the authors pointed to the need for further research into this important field. (Author)

AD-623 732 See Fld. 3/2

AD-623 835 See Fld. 13/8

AD-623 866 See Fld. 22/1

AD-623 900 See Fld. 4/2

AD-623 933 See Fld. 8/7

AD-623 980 See Fld. 20/4

AD-624 046 See Fld. 1/3

AD-624 071 See Fld. 4/1

AD-624 121 See Fld. 5/1

AD-624 235 See Fld. 9/3

14/5. REPROGRAPHY

AD-623 727 Fld. 14/5, 9/1, 13/8
CFSTI Prices: HC $2.00 MF $0.50
NATIONAL CASH REGISTER CO DAYTON OHIO ADVANCED TECHNOLOGY DEPT
HIGH RESOLUTION RAPIDLY PROGRAMMABLE MASKING FOR FUNCTIONAL ELECTRONIC BLOCKS.
Interim technical rept. no. 2, phase 2.
15 Nov 65, 27p. Contract AF33 (615)-1158
Proj. 4159 Task 415906

Unclassified report

See also AD-609 114.

Descriptors: (*Molecular electronics, Photoengraving), (*Photoengraving, Molecular electronics), (*Masking, Molecular electronics), Metal plates, Photographic plates, Positioning devices (Machinery), Servomechanisms, Automation, Optical equipment, Programming (Computers)

Major accomplishments of the report period are discussed. Efforts directed toward design and fabrication of a fully automated Phase II Microscribe Maskmaker were (1) completion of the design study and the final design of an x-y platform and drive mechanism, (2) completion of the design study and the final design of a multiple image optical system, (3) completion of the illumination system design and mock-up, and (4) fabrication of the major portion of the control unit assembly. (Author)

AD-623 914 Fld. 14/5, 9/1, 17/8
CFSTI Prices: HC $1.00 MF $0.50
YERKES OBSERVATORY WILLIAMS BAY WIS
RESEARCH, DESIGN, AND FABRICATION OF AN IMAGE TUBE FOLDED SCHMIDT SPECTROGRAPH.
Final rept., 1 Apr 63-30 Sep 65,
by W. A. Hiltner. 18 Oct 65, 14p. Contract AF19 (628)-2922 Proj. AF-8635 Task 863501
AFCRL 65-73

Unclassified report

Descriptors: (*Image tubes, Spectrographic cameras), (*Spectrographic cameras, Image tubes), (*Astronomical cameras, Image tubes), Astronomical observatories, Optical equipment, Photographic equipment, Experimental design

A spectrograph has been designed and constructed that will accommodate either the RCA cascaded image tube or an electronographic image tube if the photocathode can be operated near ground potential. The spectrograph is a grating one with an on-axis collimator, pierced grating and Schmidt camera. The complete spectrograph body is cradled in a frame that attaches to the telescope. The dispersions are 50 and 100 A/mm. (Author)

AD-624 112 Fld. 14/5, 7/4, 2/6
CFSTI Prices: HC $1.00 MF $0.50
LITTLE (ARTHUR D) INC CAMBRIDGE MASS
HIGH INTENSITY NANOSECOND DISCHARGES IN THE STUDY OF ELECTRO-OPTICAL AND CHEMICAL PROCESSES.
Final rept. 26 Aug 63-26 Aug 65,
by Alfred Buchler, and Emma Duchane. Sep 65, 16p. Rept. no. 65842
Contract AF19 (628)-3822 Proj. AF-5634 Task 563401
AFCRL 65-72

Unclassified report

Descriptors: (*High-speed photography, Light pulses), (*Light pulses, Electric discharges), (*Electric discharges, High-speed photography), (*Electrooptics, High-speed photography), (*Chemical reactions, High-speed photography), Feasibility studies, Sparks, Spectroscopy, Optical equipment, Glow discharges

The principal purpose of the work was to investigate the feasibility of using high intensity, ultra short time (nanosecond) discharges to study very fast electrooptical and chemical processes. A survey of the state of the art of flash photolysis showed that the availability of nanosecond spectroscopic light sources would provide a significant extension of the range of electro-optical and chemical processes presently accessible to study by flash photolytic techniques. The problem of adapting the Fischer nanosecond spark source for this

purpose was therefore studied, and a series of experiments were undertaken to demonstrate the feasibility of using it as a spectroscopic source in flash photolysis. These experiments showed that in fact the Fischer source could be successfully adapted for these purposes. (Author)

AD-624 150 Fld. 14/5
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS OPTICAL PHYSICS LAB
EXPANSION OF INITIAL HIGH-CURRENT SPARK CHANNELS.
Physical science research papers,
by Heinz Fischer, and C. C. Gallagher. 24 Feb 65, 14p. Rept. no. psrp-145
Proj. AF-5634 Task 563401
AFCRL 65-69

Unclassified report

Availability: Published in Applied Optics V4 N9 P115-4 Sep 65. Copies to DDC users only.

Descriptors: (*High-speed photography, Gas discharges), (*Gas discharges, Kerr cells), Photographs, Sparks

High-density short-gap sparks of nanosecond duration are triggered with a time jitter <1 nsec when charged up by a powerful 50-nsec, 7-kV pulse. This permits exact time coordination between the pulsed spark breakdown and a gated Kerr cell of 2-8 nsec exposure which is used for the photography of the initial channel. Development of the channel is observed by sequences of exposures at different gate settings. Maximum expansion velocities of 1,600,000 cm/sec in 1-atm air are determined 2.6 nsec after zero time of the breakdown, of a 1.3-nHy nanolite which value is in agreement with earlier observations by Demidov. The expansion velocity appears to follow the current. Development of erosion clouds from the anode are observed and jetlike flares appear to form after the current has ceased. (Author)

AD-623 828 **See Fld. 19/4**

AD-623 929 **See Fld. 8/4**

AD-623 956 **See Fld. 8/2**

15/2. CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL WARFARE

AD-624 242 Fld. 15/2, 6/13
CFSTI Prices: HC $3.00 MF $0.75
GENERAL ELECTRIC CO ITHACA N Y ELECTRONICS LAB
RESEARCH PROGRAMS FOR ALERTING, DETECTION, AND IDENTIFICATION OF PATHOGENS.
Final rept., 1 Oct 64-30 Jun 65,
by J. R. Gould. 30 Jun 65, 59p. Contract AF49 (638)-1418 Proj. AF-7995 AFOSR 65-1728

Unclassified report

Descriptors: (*Bacteria, Biological warfare agents), (*Biological warfare agents, Chromatographic analysis), Gas chromatography, Metabolism, Culture media, Growth, Microorganisms, Tables, Graphics

Although a high percentage of the background particulate matter is expected to be bacterial in nature, less than one viable organism per liter is normally present in the atmosphere. Therefore, a method of detecting and identifying the viable agents in the background containing a large number of nonviable agents and nonbiological materials may prove to be very useful information in the event of a biological warfare attack. In order to obtain such information, a program (AF49 (638)-1418) was initiated in October 1964 to assess the feasibility of rapidly detecting and identifying bacteria by an investigation of the microbial metabolites produced in selective culture conditions. The methodology involves the selectivity of gas chromatograph in conjunction with ultrasensitive detectors for the analysis of gases, volatile products, or other products of metabolism that can be converted into volatile derivatives. Since available detectors, such as the electron capture, condensation nuclei, and others, can detect less than parts per billion of certain organic and inorganic molecules, this approach would be expected to lend itself to the rapid detection of a very small population of microorganisms and the identification of the organism through its unique products. (Author)

15/3. DEFENSE

AD-623 918 **See Fld. 5/9**

AD-623 943 **See Fld. 5/9**

AD-623 960 **See Fld. 17/2**

AD-624 161 **See Fld. 5/11**

15/5. LOGISTICS

AD-623 845 **See Fld. 4/2**

15/6. NUCLEAR WARFARE

AD-624 139 **See Fld. 15/7**

15/7. OPERATIONS, STRATEGY, AND TACTICS

AD-624 139 Fld. 15/7, 15/6
CFSTI Prices: HC $3.00 MF $0.75
RAND CORP SANTA MONICA CALIF
ESCALATION AND THE NUCLEAR OPTION,
by Bernard Brodie. Jun 65, 97p. Rept. no. rm-4544-PR
Contract AF49 (638)-700

Unclassified report

Descriptors: (*Nuclear warfare, Theory), (*Limited war, Theory), Deterrence, History, USSR, United States Government, China, Warfare, Strategic warfare, Tactical warfare, Nuclear weapons

A critical discussion of the prevalent consesus that general war can scarcely occur except through escalation from introducing nuclear weapons into lesser conflicts. The Memorandum proposes a systematic examination of this argument by considering special crisis situations in which hostilities might break out, determining at each critical point the real constraints on each side and the various possible options. (Author)

AD-624 015 **See Fld. 5/9**

16/1. MISSILE LAUNCHING AND GROUND SUPPORT

AD-623 713 **See Fld. 4/2**

AD-624 229 **See Fld. 14/2**

16/4. MISSILES

AD-623 731 **See Fld. 5/5**

17/1. ACOUSTIC DETECTION

AD-624 136 **See Fld. 20/1**

17/2. COMMUNICATIONS

AD-623 815 Fld. 17/2, 20/6
GPL DIV GENERAL PRECISION INC PLEASANTVILLE N Y
WIDE ANGLE TELEVISION PROJECTION. VOLUME II, APPENDICES B AND C (SCHEMATICS).
Final engineering rept., phases 1 and 2,
by Louis P. Raitiere, and Urban H. Santone Jr.. Oct 64, 26p. Contract N-61339-695 NTDC 695-1

Unclassified report

See also AD-621 711.

Availability: Reference only at DDC Hq after original copies exhausted. Not for sale.

Descriptors: (*Fiber optics, Television equipment), (*Television equipment, Television cameras), Tests, Television display systems, Iconoscopes, Background, Visibility

Contents: Appendix B, Electrical schematic diagrams; Appendix C, Selected details of wide-angle lens.

AD-623 908 Fld. 17/2, 5/9, 9/1
CFSTI Prices: HC $2.00 MF $0.50
SYSTEMS RESEARCH LABS INC DAYTON OHIO
TEST AND EVALUATION OF ELECTRONIC IMAGE GENERATION AND PROJECTION DEVICES. VOLUME I. EVALUATION TECHNIQUE.
Final rept., Jul 64-Jul 65,
by John H. Harshbarger. Aug 65, 46p. Contract AF33 (615)-1889 Proj. AF-6114 Task 611405
AMRL TR-65-116-Vol I

Unclassified report

Descriptors: (*Television display systems, Training devices), (*Training devices, Astronautics), Resolution, Brightness, Scanning, Display systems, Television equipment, Television cameras, Cathode ray tube screens, Simulation, Photometers

A method is described for evaluation of all types of displays in terms of resolution, brightness, and contrast ratio. The technique employs a television camera to replace human observation, and translates the characteristics of the display to measurable electronic waveforms. The waveforms are displayed on an oscilloscope where they may be analyzed directly and photographed, thus providing known standards of measurements in terms of electrical units rather than depending upon human judgment as a comparison standard. Direct evaluation may be applied to any display. The observer television camera furnishes data which are an expression of the display fidelity. Brightness is measured by a photometer. These terms are subsequently interrelated in an expression of the contrast ratio attainable at various resolution and brightness levels. The analytical evaluation, especially applicable to cathode ray tube (CRT) displays, obtains data through examination of the minute scanning spot as it traverses the image area. Analysis of the beam spot behavior enables one to predict the ultimate CRT capabilities without generating a complete display. (Author)

AD-623 910 Fld. 17/2, 9/4
CFSTI Prices: HC $1.00 MF $0.50
LINCOLN LAB MASS INST OF TECH LEXINGTON
ERROR STATISTICS AND CODING FOR BINARY TRANSMISSION OVER TELEPHONE CIRCUITS,
by A. B. Fontaine, and R. G. Gallager. 30 Oct 60, 21p. Rept. no. 25-G-0023
Contract AF19 (604)-7400

Unclassified report

Descriptors:, (*Telephone communication systems, Coding), (*Coding, Errors), Data transmission systems, Telephone signals, Telephone equipment, Circuits, Digital systems, Feedback, Corrections

Commercial transmission of digital data over telephone circuits is capable of providing an overall

error probability on the order of 0.00001, but in many situations, lower error probabilities are either needed or highly desirable. The efficient combination of coding with existing digital data systems to provide these lower error rates is discussed.

AD-623 960 Fld. 17/2, 9/1, 15/3, 5/2
CFSTI Prices: HC $3.00 MF $0.75
NAVAL RESEARCH LAB WASHINGTON D C
COLOR CATHODE RAY TUBE DISPLAYS IN COMBAT INFORMATION CENTERS.
Final rept.,
by D. C. Burdick, L. M. Chauvette, J. M. Duls, and A. E. Goins. 6 Oct 65, 66p. Rept. no. nrl-6348
Proj. SF-007-05-01-6041

Unclassified report

Descriptors: (*Color television tubes, Television display systems), (*Combat information centers, Television display systems), (*Television display systems, Combat information centers), (*Cathode ray tubes, Display systems), Command + control systems, Information retrieval, Color television, Information theory, Color vision, Human engineering, Cost effectiveness

Some recent technological advancements with color in cathode ray tube (CRT) displays, the continuing demand to present additional information more efficiently in command and control centers, and the introduction of stored information systems have stimulated renewed interest in color as a coding dimension. This study examines the human factors and engineering considerations as they relate to the central problem of the relative cost effectiveness of color-given the present engineering state-of-the-art-as compared to other coding dimensions for combat information displays and concludes that: (1) The comparative ranking of color with other coding dimensions is high related to the task performed (2) Other situational factors greatly affect the value of color as a coding dimension (3) There are perceptual problems involving the use of color, but techniques are available to enhance the value of color as a coding dimension (4) The state-of-the-art for producing color CRT displays in encouraging, but only two tubes seem likely to have application in the near future (5) Monetary cost estimates have been difficult to obtain, but other more easily ascertained cost factors indicate that for some tasks color will be well worth the cost. (Author)

AD-624 020 **See Fld. 9/2**

AD-624 100 **See Fld. 9/5**

17/2.1 RADIO COMMUNICATIONS

AD-623 761 Fld. 17/2.1
CFSTI Prices: HC $6.00 MF $1.25
MOTOROLA INC CHICAGO ILL
SPECTRUM SIGNATURE MEASUREMENTS FOR RADIO SET AN/TRC-87.
Final rept.,
by Carl P. Jesperson. Oct 65, 215p. Contract AF19 (628)-529 Proj. AF-412L RADC TR-65-244

Unclassified report

Descriptors: (*Spectrum signatures, Radio equipment), (*Radio equipment, Spectrum signatures), Reliability (Electronics), Ultrahigh frequency, Radio communication systems, Electromagnetic properties

The report describes results of spectrum signature measurements on Radio Set AN/TRC-87, a UHF communications system at the Chicago Military Electronics Center of Motorola, Inc. Measurements were taken in accordance with MIL-STD-449A and approved procedures for the AN/TRC-87 system. ECAC bulletins were used as a guide to improve the reliability of the results.

17/3. DIRECTION FINDING

AD-624 166 Fld. 17/3, 20/14, 9/5
CFSTI Prices: HC $3.00 MF $0.75
RADIOLOCATION RESEARCH LAB UNIV OF ILLINOIS URBANA
CHARACTERISTICS OF THE MONOPULSE MODE DISPLAY FOR THE WULLENWEBER RADIO DIRECTION FINDING SYSTEM.
Technical rept.,
by Arnold Stephen Rosenbaum. Oct 65, 82p.
Rept. no. RRL-291 ,TR-16
Contract NObsr-89229

Unclassified report

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Direction finding, Radio equipment), (*Antenna arrays, Direction finding), (*Radio equipment, Direction finding), Display systems, Radio waves, Propagation, Simulation, Digital computers, Programming (Computers), Radiofrequency spectroscopy

Contents: System description, computer program, simple spectrum configurations, and complex spectrum configurations.

17/4. ELECTROMAGNETIC AND ACOUSTIC COUNTERMEASURES

AD-623 729 Fld. 17/4, 17/9, 20/14
CFSTI Prices: HC $1.00 MF $0.50
MICHIGAN UNIV ANN ARBOR RADIATION LAB
MINIMIZATION OF END-FIRE RADAR ECHO OF A LONG THIN BODY BY IMPEDANCE LOADING,
by Kun-Mu Chen. Oct 65, 24p. Rept. no. TR-4

Contract AF33 (615)-1656 Proj. AF-5546 Task 554601

Unclassified report

Prepared in cooperation with Michigan State Univ., East Lansing.

Descriptors: (*Electronic countermeasures, Radar deception), (*Radar deception, Impedance matching), (*Impedance matching, Radar deception), (*Radar echo areas, Reduction), Cylindrical bodies, Radar reflections, Electrical impedance, Electromagnetism

A theory of the minimization of the end-fire radar echo of a long, thin body by an impedance loading technique is presented. When a long, thin body is illuminated by a plane wave in the region of longitudinal incidence, a large back scatter is observed. This back scatter is due to the induced traveling wave which is reflected from the rear end of the body. By an appropriate impedance loading, this back scatter can be minimized. In this paper, the induced current on a long, thin and loaded cylinder is studied. The optimum impedance loading which minimizes the endfire radar echo is explicitly obtained. Theoretical results are compared with the experimental data and an excellent agreement is obtained. (Author)

AD-623 728 **See Fld. 9/5**

17/5. INFRARED AND ULTRAVIOLET DETECTION

AD-623 797 Fld. 17/5, 22/2, 1/3
CFSTI Prices: HC $2.00 MF $0.50
NAVAL ORDNANCE TEST STATION CHINA LAKE CALIF
HITAB ATTITUDE CONTROL SYSTEM.
Final rept.,
by William Smith. Oct 65, 35p. Rept. no. nots-TP-3782

Unclassified report

Descriptors: (*Sounding rockets, Attitude control systems), (*Attitude control systems, Sounding rockets), (*Guided missile tracking systems, Infrared tracking), Inertial guidance, Instrumentation, Jets, Thrust vector control systems, Infrared radiation, Ultraviolet radiation, Background, Earth, Rocket motors, Exhaust flames, Target acquisition, Ultraviolet detectors

An attitude control system (ACS) is included in the payload of the Hitab-Aerobee sounding rocket to provide attitude stabilization and controlled maneuverability to the vehicle. It is a ground-oriented, inertially controlled system utilizing two 2-degree-of-freedom gyroscopes to provide the inertial reference. Rate gyro damping is included for stability, while eight cold-gas reaction jets provide the control torques. The system is now manufactured and distributed by the Space General Corporation, El Monte, Calif., for use in the Aerobee 150 sounding rocket. (Author)

AD-624 207 Fld. 17/5, 13/8, 20/12
CFSTI Prices: HC $4.00 MF $1.00
SANTA BARBARA RESEARCH CENTER GOLETA CALIF
PRODUCTION ENGINEERING MEASURE. PBSE INFRARED DETECTOR - TYPE IR-200, VOLUME I.
Final engineering rept. 1 Jan 63-31 Aug 65,
by G. H. Cook. 10 Nov 65, 148p. Contract DA-36-039-AMC-01466 (K)

Unclassified report

See also AD-624 208.

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Infrared detectors, Manufacturing methods), (*Photoelectric cells (Semiconductor), Infrared detectors), Lead alloys, Selenium alloys, Quality control, Industrial equipment, Test equipment, Processing, Tests, Production, Mechanical drawings

The design requirements of SCS-34A as revised were translated into engineering drawings. Engineering samples of the IR-200 detector were fabricated and evaluated. Tooling and test equipment was designed and fabricated to support a production rate of fifteen detectors per 8-hour shift. Twelve preproduction detectors were fabricated and tested, with difficulties encountered. A second group of twelve preproduction detectors was fabricated with no difficulties encountered. Twenty-five units were fabricated and acceptance tested for the pilot run. Operation times and yields were established, and a production capability of fifteen units per 8-hour shift was confirmed. A Project Quality Manual was prepared and submitted for approval. Inspection and Test Procedures were prepared for each required step in the manufacturing and test sequence. Manufacturing Procedures were written for each manufacturing operation. The manufacturing and inspection requirements were integrated by an operation flow chart. Delivery of the special tooling and the Bill of Materials is being made simultaneously with the submission of this report. (Author)

AD-624 208 Fld. 17/5, 13/8, 20/2
CFSTI Prices: HC $5.00 MF $1.00
SANTA BARBARA RESEARCH CENTER GOLETA CALIF
PRODUCTION ENGINEERING MEASURE. PBSE INFRARED DETECTOR, TYPE IR-200 VOLUME II.
Final engineering rept., 1 Jan 63-31 Aug 65,
by E. Murray. 10 Nov 65, 178p. Contract DA-36-039-AMC-01466 (K)

Unclassified report

See also AD-624 207.

Descriptors: (*Infrared detectors, Manufacturing methods), (*Photoelectric cells (Semiconductor), Infrared detectors), Lead alloys, Selenium alloys, Quality control, Processing, Specifications, Production

17/7. NAVIGATION AND GUIDANCE

AD-623 821 Fld. 17/7, 12/2
CFSTI Prices: HC $3.00 MF $0.75
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J RESEARCH DIV
AIR TRAFFIC SURVEILLANCE SATELLITES, A MATHEMATICAL MODEL FOR ACCURACY AND COVERAGE.
Final rept.,
by John J. Kulik. Apr 65, 67p. Rept. no. rd-65-38

Unclassified report

Descriptors: (*Air traffic control systems, Reconnaissance satellites), (*Reconnaissance satellites, Navigation satellites), (*Mathematical models, Position finding), Effectiveness, Probability

The theoretical accuracy and coverage of the two most promising air traffic surveillance satellite techniques--a two-satellite multi-rho technique and a single satellite rho-theta-theta technique--are determined by the application of a mathematical model used to derive error isograms for several combinations of satellite positions and range and angle measurement error assumptions. The complete derivation and discussion of the model employed is included, since the model is sufficiently general to apply to a great number of situations involving position determination other than air traffic surveillance. Some conclusions as to the relative merits of the two techniques studied are given, and recommendations are made for future activity. (Author)

AD-623 823 Fld. 17/7
CFSTI Prices: HC $4.00 MF $0.75
AIRBORNE INSTRUMENTS LAB DEER PARK N Y
DEVELOPMENT OF PRECISION VHF OMNIRANGE.
Final rept.,
by B. Gold, E. Hollm, J. Lovell, R. Mesard, and M. Zeltser. Dec 64, 104p. Contract ARDS-553 Proj. FAA-330-004-01N SRDS RD-64-29

Unclassified report

Descriptors: (*Radio navigation, Air traffic control systems), Very high frequency, Direction finding, Range finding, Antenna lobes, Antenna radiation patterns, Flight testing, Aircraft equipment, Navigational aids, Doppler systems, Airborne

The Precision VHF Omnirange (PVOR) consists of an International Civil Aviation Organization (ICAO) standard VOR that has been modified to transmit additional precision multilobe bearing information on the same channel. A standard airborne navigation receiver with a PVOR converter automatically resolves the ambiguities of the multilobe signal. An unmodified navigation receiver continues to use only the standard portion of the signal with no degradation in performance. Flight tests of the PVOR combined with a four-loop VOR and with a Doppler VOR indicate an improvement in system accuracy of better than 5 to 1. The overall reduction in siting effects is slightly better than that obtained with a Doppler VOR. The multilobe principle provides a potential 13-fold improvement in instrumentation and monitoring accuracy. The system described is a feasibility model. It is recommended that further effort be expended on an engineering model of a complete system, including monitoring and calibration equipment. (Author)

AD-623 824 Fld. 17/7, 9/2
CFSTI Prices: HC $3.00 MF $0.75
UNIVAC DIV SPERRY RAND CORP ST PAUL MINN
PROGRAMMING, INTEGRATION, AND CHECKOUT OF THE STORED PROGRAM ALPHA-NUMERIC BEACON SYSTEM.
Final rept.
Jun 65, 90p. Rept. no. PX-3539
Contract FA64WA-5020 Proj. 105-200D SRDS RD-65-79

Unclassified report

Descriptors: (*Programming (Computers), Air traffic control systems), (*Radar beacons, Air traffic control systems), (*Air traffic control systems, Radar beacons), Display systems, Checkout procedures, Operations research, Digital systems, Video integration

The Stored Program Alpha-Numeric Beacon System provides enroute area controllers with bright display of symbolic and alpha-numeric data relative to controller initiated tracks and automatically maintains continuous association between this data and beacon video by means of digital tracking techniques. The system consists of a digital computational subsystem, three beacon subsystems, and a display subsystem. Work performed under this contract includes design and preparation of the computer program for the operational system, electrical and operational integration of the system at the Air Route Traffic-Control Center at Indianapolis, Indiana, and checkout of the system to verify its compliance to government specifications and requirements. All system equipments, the system site, and site furnishings were provided by the government. The major functional elements of the operational computer program are tracking, processing of controller inserted data and requests, and preparation of properly formatted messages for display. The tracking function is multistate alpha, beta, straight line tracking. The availability of the system's general purpose digital computer made possible an approach to equipment system integration which was primarily based upon a sequence of specially designed programed tests. (Author)

AD-624 200 Fld. 17/7
CFSTI Prices: HC $2.00 MF $0.50
NAVAL OCEANOGRAPHIC OFFICE WASHINGTON D C
DATA ON THE USE OF SECTOR RADIO-RANGE BEACONS AND THE CHARACTERISTICS OF OPERATION,
by E. Ya. Shchegolev. 1965, 26p. Rept. no. trans-247
TT 65-64591

Unclassified report

Ekspluatatsionnye Dannye Sektornykh Radiomayakov is Osobennosti Raboty, trans. of mono. Radioteknicheskie Sredstva Morskogo Sudovozhdeniya, Moscow, 1956, p292-313.

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Radio navigations, Radio beacons), (*Radio beacons, Direction finding), (*Direction finding, Radio beacons), Electromagnetic fields, Antennas, Vector analysis, USSR

The characteristics of electromagnetic field in the area near the radio-range beacon are analysed, pointing out the audibility zones. Thus the degree of accuracy in determining the bearings of the beacons is increased. A comparison among various radio-range beacons (Stavanger, Ploneis, Bushmills) shows the variations of accuracy when determining a ship's location in various sectors and the means of improving the accuracy. The development of the improved consolan type of sector radio-range beacons, which was discussed at the International conference on ocean navigation in 1954-1955, is also outlined. (Author)

AD-624 201 Fld. 17/7
CFSTI Prices: HC $1.00 MF $0.50
NAVAL OCEANOGRAPHIC OFFICE WASHINGTON D C
SECTOR RADIO-RANGE BEACONS,
by A. I. Mizernitskii. 1965, 15p. Rept. no. trans-248
TT 65-64595

Unclassified report

Sektornye Radiomyaki, trans. of mono. Navigatsiya, Moscow, 1963, p406-17.

Descriptors: (*Radio navigation, Radio beacons), (*Radio beacons, Direction finding), (*Direction finding, Radio beacons), Operation, Antennas, USSR, Radio signals

The structure, types and operation of the sector radiorange beacons are described and illustrated by diagrams. The switching of phases in inner and outer antennas and their significance in determining the location of ships is analysed. The operating method of the radio-range beacon Terpeniya is presented as an example. Data on call letters, Kc, base length, transmission signals, direction of normal, etc., are tabulated for the beacons at Bushmills, Stavanger, Ploneis, Seville, Rybachiy, Kanin, Terpeniya and Shumusku. (Author)

AD-623 935 See Fld. 14/2

AD-624 133 See Fld. 9/2

AD-624 218 See Fld. 22/3

AD-624 219 See Fld. 22/3

17/8. OPTICAL DETECTION

AD-623 756 See Fld. 4/1

AD-623 914 See Fld. 14/5

AD-623 929 See Fld. 8/4

AD-624 096 See Fld. 9/5

17/9. RADAR DETECTION

AD-623 973 Fld. 17/9
CFSTI Prices: HC $4.00 MF $0.75
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
AN ANALYSIS OF DIGITAL RANGE TRACKERS.
Technical memo.,
by Charles Edward Ackerman. Jul 65, 120p.
Rept. no. tg-717
Contract NOw-62-0604-c

Unclassified report

Descriptors: (*Radar tracking, Digital systems), (*Radar receivers, Digital systems), Analog-to-digital converters, Radar targets, Linear systems, Nonlinear systems, Circuits

The range tracker is a device used in the receiver of pulse radar systems which performs the vital operation of maintaining automatic range track on the received target pulse. Normally the range tracker is a second-order control system with the measured range being the controlled output. The digital range tracker performs this operation by utilizing digital circuit techniques. In this paper a linear and a nonlinear digital range tracker system are analyzed. The linear system employs a multi-state analog-to-digital (A/D) converter which senses the sign and magnitude of the error and between the target and measured range. The nonlinear system employs an A/D converter which senses only the sign or absence of range error. Z-transform techniques are employed to develop the transfer functions for the linear system. System characteristics such as transient response, stability and time solutions for various input functions are given. Piece-wise linear equations are

used as the governing equations for the nonlinear system. The analysis emphasizes system velocity response to velocity-step inputs and closed-loop range response to a specific periodic input. (Author)

AD-624 191 Fld. 17/9, 20/14
CFSTI Prices: HC $2.00 MF $0.50
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS
EFFICIENT RECURSIVE SOLUTIONS FOR PLANE AND CYLINDRICAL MULTILAYERS,
by J. H. Richmond. 10 Aug 65, 27p. Rept. no. osurf-1968-1
Contract NOw-65-0329-d
Unclassified report

See also AD-623 371.

Descriptors: (*Recursive functions, Wave transmission), (*Electromagnetic wave reflections, Radar corner reflectors), (*Radar corner reflectors, Optimization), Dielectrics, Radar reflections, Microwave equipment, Antenna radiation patterns, Numerical analysis, Programming (Computers)

An efficient recursive solution is developed for the transmission and reflection coefficients of a plane multilayer and for the scattering pattern of a cylindrical multilayer. The two principal polarizations are considered, and digital-computer programs are included. The technique is also applicable to the multilayered sphere. The appropriate equations are also given for the reflection coefficients of a perfectly conducting plane which is coated with a stack of homogeneous dielectric sheets, and for the scattering pattern of a perfectly conducting circular cylinder coated with several homogeneous dielectric layers. (Author)

AD-623 729 See Fld. 17/4

AD-623 853 See Fld. 9/5

AD-624 053 See Fld. 9/2

17/10. SEISMIC DETECTION

AD-623 820 See Fld. 18/3

18/3. NUCLEAR EXPLOSIONS

AD-623 719 Fld. 18/3, 13/13
CFSTI Prices: HC $2.00 MF $0.50
BLUME (JOHN A) AND ASSOCIATES SAN FRANCISCO CALIF RESEARCH DIV
STRUCTURAL RESPONSE OF RESIDENTIAL-TYPE TEST STRUCTURES IN CLOSE PROXIMITY TO AN UNDERGROUND NUCLEAR DETONATION.
Final rept.
Aug 65, 30p. Proj. Dribble ARPA VUF-1030
Unclassified report

Rept. on VELA Uniform Program; Salmon Event, Tatum Salt Dome, Miss., 22 Oct 64.

Descriptors: (*Nuclear explosion damage, Structures), (*Structures, Nuclear explosion damage), Buildings, Underground explosions, Accelerometers, Seismology, Concrete, Wood

Response was measured in three one-story simulated residential structures at distances of 2,000, 3,000 and 4,000 meters from Surface Zero for the Salmon event. Statham accelerometers were mounted at roof and floor levels in concrete block and wood frame structures. Peak measured accelerations ranged from about 1.5g (gravity units) at the near structure (concrete block) to about 0.7g at the middle structure (wood frame) to about 0.4g at the most distant structure (wood frame). No damage was observed in any of the instrumented structures; a companion block structure to the wood frame structure at the 4,000-meter distance suffered extension of pre-existing cracks. (Author)

AD-623 720 Fld. 18/3, 13/13
CFSTI Prices: HC $2.00 MF $0.50
BLUME (JOHN A) AND ASSOCIATES SAN FRANCISCO CALIF RESEARCH DIV
STRUCTURAL RESPONSE OF TALL INDUSTRIAL AND RESIDENTIAL STRUCTURES TO AN UNDERGROUND NUCLEAR DETONATION.
Final rept.
Aug 65, 31p. Proj. Dribble ARPA VUF-1031
Unclassified report

Rept. on VELA Uniform Program; Salmon Event, Tatum Salt Dome, Miss., 22 Oct 64.

Descriptors: (*Nuclear explosion damage, Structures), (*Structures, Nuclear explosion damage), Buildings, Underground explosions, Seismology, Velocity

Two tall refinery structures and an eight-story University women's dormitory structure were instrumented for measurement of response to ground motion generated by the Salmon event. The refinery is about 18 kilometers from Surface Zero; the dormitory is about 30.8 kilometers. NGS 19L velocity meters were deployed at several levels on the refinery structures, and Sprengnether portable displacement meters were used on the top and bottom floors of the dormitory. Measured peak top level velocities in the two refinery structures were 7.31 centimeters per second in the taller TCC structure and 5.6 centimeters per second in the DIB tower, at periods of 0.19 seconds and 0.20 seconds respectively. Peak top floor displacement in the dormitory was 0.15 centimeters with a period of about 0.43 seconds. Blume observers reported a clearly perceptible motion in the dormitory, felt by uninformed persons on bottom and top floors. No official observers were present at the refinery but personnel working there also reported clearly perceptible motion. (Author)

AD-623 721 Fld. 18/3
CFSTI Prices: HC $3.00 MF $0.50
STANFORD RESEARCH INST MENLO PARK CALIF
FEASIBILITY OF CAVITY PRESSURE AND TEMPERATURE MEASUREMENTS FOR A DECOUPLED NUCLEAR EXPLOSION.
Final rept.,
by L. M. Swift, S. Rubin, and T. O. Passell. Sep 65, 53p. Proj. DRIBBLE VUF 3017
Unclassified report

Rept. on VELA Uniform Program, Salmon Event, Tatum Salt Dome, Miss., 22 Oct 64.

Descriptors: (*Nuclear explosions, Explosion effects), Measurement, Feasibility studies, Shock waves, Pressure, Brightness, Temperature, Radiation measurement systems, Thermal radiation, Air

A study was made of the feasibility of measuring the pressure produced at the wall of a 14.5-meter spherical cavity by a 0.1-kt nuclear explosion. It was concluded that it will be feasible to make the desired measurements, and an experiment plan is recommended that appears to promise the most useful results. It was found feasible to measure the temperature of hot air near the edge of an underground cavity in which a 0.1-kt nuclear explosion has occurred. Measurement of the relative brightness of the radiating air in bands 100A wide centered at 2500 and 3500A will give the temperature to =8 percent if the brightness ratio is determined to =20 percent. (Temperatures in the range 4000K to 10,000K are anticipated.) An absolute brightness measurement in either or both channels gives an independent measure of temperature. With existing sensors, temperature can be followed to 20 msec after detonation, using a 100-meter long x 0.1-meter diameter nitrogen-filled light pipe with a reflecting aluminum liner. If radiation detectors with response times shorter than 0.1 msec can be installed to survive the passage of the pressure wave, measurements to longer times are possible.

AD-623 820 Fld. 18/3, 17/10, 8/11
CFSTI Prices: HC $3.00 MF $0.75
RAND CORP SANTA MONICA CALIF
NUCLEAR EXPLOSIONS IN CAVITIES,
by H. L. Brode. Nov 65, 69p. Rept. no. RM-3727
Contract AF33 (657)-9619
Unclassified report

Descriptors: (*Nuclear explosions, Underground explosions), (*Underground explosions, Damping), (*Seismology, Nuclear explosions), Explosion effects, Underground structures, Engineering geology, Structural geology, Seismic waves, Absorption, Detection

Underground cavities have been suggested as an effective means of reducing the seismic signals from nuclear detonations. This memorandum reports the wall pressures, temperatures, and densities for five specific examples, for which average cavity pressures range between 44 and 420 bars, with peak pressures between 0.2 and 8.2 Kbars. One nuclear yield, 1.7 kilotons, was exploded (theoretically) in two cavities of 20 and 40 meters radius, each with normal and one-tenth normal air density in it. The larger cavity was also used with a density of one-hundredth normal. In addition to the wall pressures, temperatures, and densities as functions of time for each case, some typical pressure, temperature, and density profiles in the cavity interiors at various times are reported. (Author)

AD-624 016 See Fld. 8/11

AD-624 019 See Fld. 9/1

AD-624 041 See Fld. 20/8

18/4. NUCLEAR INSTRUMENTATION

AD-623 722 Fld. 18/4, 20/8
CFSTI Prices: HC $4.00 MF $0.75
SOLID STATE RADIATIONS INC LOS ANGELES CALIF
NEUTRON DETECTION AND SPECTROSCOPY WITH SEMICONDUCTOR DETECTORS.
Final rept. rev.,
by M. R. Zatzick, and E. L. Zimmerman. Apr 65, 117p. Contract DA-18-108-405-Cml-1012
USANDL TR-54
Unclassified report

Descriptors: (*Neutron detectors, Nuclear spectroscopy), (*Semiconductor devices, Neutron detectors), Neutron spectrum, Spectrum analyzers, Neutron counters, Semiconductor films, Electrodeposition, Vapor plating, Sandwich construction, Lithium, Boron, Uranium

Results are presented of a study of methods for utilizing diffused junction, semiconductor detectors in neutron detection and spectroscopy. The study resulted in the development of various neutron-sensitive coated detectors and the Li6 epithermal neutron spectrometer system, which consists of a Li6-sandwich detector and a complete, integrated electronic system. The techniques investigated for applying neutron-sensitive materials to detector surfaces included solution evaporation, vacuum evaporation, and electrodeposition. Solution evaporation is preferable when a thick coating of B10 or U235 is desired for maximum sensitivity. Vacuum evaporation is preferable when very thin uniform films of Li6 and Li6F are required on the detector surface. A thermal neutron source was used to observe the response of each coating material deposited on the detectors as a function of dead layer and radiator thickness. Theoretical relationships depending on range-energy relation-

ships adequately predict the response of coated detectors as a function of converter material thickness, detector dead layer, and discriminator settings. The detector developed for the epithermal neutron spectrometer system consists of a layer of Li6F sandwiched between two silicon detectors in a hermetically sealed package. (Author)

AD-623 878 Fld. 18/4, 20/8
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
CHARGED PARTICLE TRACKS IN POLYMERS: NUMBER I - DELINEATION AND MEASUREMENT OF SUB-SURFACE TRACKS,
by M. M. Collver, E. V. Benton, and R. P. Henke.
4 Oct 65, 16p. Rept. no. usnrdl-TR-917
Proj. SR-011-01-01 Task 0401
Unclassified report

Descriptors: (*Radiation measurement systems, Polymers), (*Polymers, Radiation measurement systems), Nitrocellulose, Alpha particles, Particle trajectories, Radiation damage, Ion bombardment, Charged particles

A technique for the delineation of sub-surface charged particle tracks by a successive chemical removal of surface material is presented. A method of measuring the approximate range of heavily ionizing charged particles in polymers is given. The techniques are applied to the observation and measurement of low-energy He4 ion tracks in cellulose nitrate. (Author)

AD-624 127 Fld. 18/4, 20/8, 6/18
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
RESPONSE OF LIF TO NEUTRONS AND CHARGED PARTICLES,
by Catherine L. Wingate, Eugene Tochilin, and Norman Goldstein. 28 Sep 65, 38p. Rept. no. usnrdl-TR-909
Proj. SF-011-05-11 Task 0503
Unclassified report

Descriptors: (*Dosimeters, Response), (*Neutron detectors, Luminescence), (*Lithium compounds, Fluorides), Alpha particle detectors, Charged particles, Thermal neutrons, Fast neutrons, Neutron reactions

The thermoluminescent response of LiF was investigated with thermal neutrons and with fast neutrons at energies extending from 0.26 to 14 Mev. The results indicated that thermal neutron fluence may be conveniently measured with normal LiF but a higher readout temperature is required than for gamma dose measurements. Studies of fast neutron response with Li7F (to minimize thermal effects) showed a low neutron sensitivity which was strongly dependent on energy. Fast neutron response was also investigated for a dosimeter in which the powder was suspended in alcohol. The LET response of LiF was studied using alpha particles with energies from 900 Mev down to 2 Mev. (Author)

AD-624 202 Fld. 18/4, 6/18
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
A LABORATORY APPARATUS FOR MEASURING THE AMOUNT OF TRITIUM ACTIVITY REMOVED FROM A CONTAMINATED SURFACE, BY DIRECT CONTACT WITH THE SURFACE,
by William R. Balkwell, and Don A. Kubose. 30 Sep 65, 31p. Rept. no. usnrdl-TR-913
Proj. SF-011-01-03 Task 11275
Unclassified report

Descriptors: (*Tritium, Determination), (*Contamination, Tritium), (*Surfaces, Contamination), Laboratory equipment, Glycols, Alkenes, Promethium, Metals, Measurement, Samplers

The sampling component is a small glass roller wrapped with a strip of filter paper dampened with ethylene glycol. It is rolled over the contaminated surface to sample the activity. After a run, the contaminated roller is dropped immediately after contact with the surface into a counting vial containing a scintillant solution, and the activity is assayed. The apparatus is small enough to be operated in a conventional glove box. The precision of the measurements is influenced by the texture of the surface sampled. Precision measured on a smooth optical quartz surface using a nonvolatile tracer, promethium (143), as a contaminant, was determined to be = 2%. The precision for tirtium sampling from a relatively coarser, nonuniform metal surface was approximately = 25%. The apparatus can be used to study the rate of tritium desorbed from the surface, which allows estimation of the cumulative hazard effect of multiple contacts with the surface during the desorption period. Representative samples of metal surfaces exposed to tritium show that after exposure, desorption is exponential, decreasing to an 'equilibrium' amount within a few hours. Multiple contracts with these desorbing surfaces did not seem to significantly alter the desorption process. (Author)

AD-624 231 Fld. 18/4
CFSTI Prices: HC $1.00 MF $0.50
NEW YORK UNIV N Y SCHOOL OF ENGINEERING AND SCIENCE
A SURVEY OF DEVICES FOR MONITORING X RADIATION.
Mar 63, 23p. Rept. no. sete-228/4
Proj. SETE

Descriptors: (*X-rays, Radiation measurement systems), (*Radiation measurement systems, Reviews), Portable, Radiation monitors, Dosimeters, Radio transmitters

The report surveys the existing methods of monitoring x-radiation, describes their operation and limitations and tabularizes those portable devices capable of detecting and measuring x-radiation.

18/8. RADIOACTIVITY

AD-623 904 Fld. 18/8, de/p ,
CFSTI Prices: HC $3.00 MF $0.75
GENERAL ATOMIC SAN DIEGO CALIF SPECIAL NUCLEAR EFFECTS LAB
TRANSIENT RADIATION EFFECTS ON ELECTRONIC PARTS.
Final rept., 16 Jun 64-14 Jun 65,
by V. A. J. van Lint, R. F. Overmyer, and D. K. Nichols. 10 Jul 65, 88p. Rept. no. GA-6534
Contract DA-36-039-sc-89196 Proj. DA-1C0-24401-A-348 Task 1C0-24401-A-348-05
Unclassified report

Descriptors: (*Radiation damage, Electronic equipment), (*Dielectrics, Radiation damage), Conductivity, Mica, Ceramic materials, Tantalum compounds, Oxides, Polyester plastics, Capacitors, Coaxial cables, Plasma medium

Prompt and delayed conductivity in mica, ceramic, tantalum oxide, and Mylar dielectrics with various types of electrodes under Linac irradiation are reported. Fastneutron-induced conductivity of a Mylar capacitor irradiated in the TRIGA reactor is found to be =4.4 X 10 to the minus 27th power (nv) to the 0.95 power. A theory of neutron-induced ionization in insulators has been formulated which predicts linear dependence of conductivity with neutron energy deposition rate. Data from irradiations of EG-58 aluminum coaxial cable at the TRIGA reactor facility, at the Sandia Pulsed Reactor Facility, and with a 14-MeV neutron generator show that the saturated response of EG-58 is smaller than conventional RG-58 cable response. Ionized-gas experiments in a parallel-plate geometry indicate that a potential of -2.5 v is sufficient to repel approximately one-half the secondary electrons reaching the signal plate from nearby plates. A computer program describing the motion of holes and electrons in a p-n diode has been revised to describe the motion of electrons and ions in an ionized gas in parallel-plate geomtry under an applied field. (Author)

AD-624 019 **See Fld. 9/1**

18/9. REACTOR ENGINEERING AND OPERATION

AD-623 818 **See Fld. 18/11**

AD-624 157 **See Fld. 12/2**

18/11. REACTOR PHYSICS

AD-623 818 Fld. 18/11, 18/9
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
HOMOGENEOUS CRITICAL ASSEMBLY WITH PROFILED FUEL LOADING,
by A. K. Krasin, and E. I. Inyutin. 10 Nov 65, 11p. Rept. no. ftd-TT-65-1609
TT 65-64561
Unclassified report

Unedited rough draft trans. of Atomnaya Energiya (USSR) v18 n2 p175-7 1965.

Descriptors: (*Critical assemblies, Homogeneous reactors), Reactor fuel elements, Neutron flux, Thermal neutrons, Reactor fuel processing, USSR

A homogeneous critical assembly with profiled fuel loading aiming at the equalization of the energy emission in the active zone is described. Characteristics of the critical assembly, scheme of the critical experiment, neutron flux distributions, and fuel distribution and energy emission are discussed.

19/1. AMMUNITION, EXPLOSIVES, AND PYROTECHNICS

AD-623 860 Fld. 19/1, 21/2, 7/4
CFSTI Prices: HC $2.00 MF $0.50
AEROJET-GENERAL CORP SACRAMENTO CALIF SOLID PROPELLANT RESEARCH OPERATIONS
SURFACE RATE PROCESSES AND SENSITIVITY OF HIGH EXPLOSIVES,
by R. F. Chaiken, and F. J. Cheselske. 1965, 34p.
Contract Nonr-2804 (00) ,AF49 (638)-851
AFOSR 1622
Unclassified report

Descriptors: (*Explosive materials, Surface properties), (*TNT, Surface properties), (*RDX, Surface properties), (*Tetryl, Surface properties), (*PETN, Surface properties), Reaction kinetics, Combustion, Pyrolysis, Thermodynamics, Melting point, Rheology, Heat of activation, Heat transfer, Fluid flow, Impact shock, Friction, Sensitivity

The nature and rate of linear surface regression of TNT, RDX, tetryl and PETN were studied utilizing a hot plate pyrolysis technique over surface temperatures ranging as high as 500C. The data, when compared to similar data for benzoic acid, suggest that the primary surface rate process appears to be an endothermic meltflow having an apparent activation energy suggestive of heat transfer and viscous flow as a rate controlling step. These data, when used as a measure of surface heat dissipation, correlate very well with the measured values of impact sensitivity. Also, they offer an explanation for the fact that attempts to correlate impact and/or friction sensitivity with melting point alone could lead to misleading results when PETN and RDX are considered. (Author)

AD-624 082 **See Fld. 14/2**

19/4. EXPLOSIONS, BALLISTICS, AND ARMOR

AD-623 828 Fld. 19/4, 14/5
CFSTI Prices: HC $3.00 MF $0.75
UNDERWATER EXPLOSIVES RESEARCH LAB WOODS HOLE MASS
PHOTOGRAPHY OF UNDERWATER EXPLOSIONS III HIGH SPEED PHOTOGRAPHS OF BUBBLE PHENOMENA,
by E. Swift,Jr., P. M. Fye, J. C. Decius, and R. S. Price. 17 Dec 46, 67p. NAVORD 95-46
Unclassified report

Descriptors: (*Underwater explosions, High-speed photography), (*Underwater photography, Underwater explosions), (*Bubbles, Underwater explosions), (*Highspeed photography, Underwater explosions), Motion picture photography, Explosion bubbles, Underwater ordnance, Cavitation

The techniques developed recently at the Underwater Explosives Research Laboratory for photographing underwater explosions in the open ocean are described. High speed motion pictures of explosion product bubbles from 1 oz and 1/2 lb charges of various explosives are shown. These pictures were taken at depths ranging from 200-700 ft. The oscillation of the bubble can be followed through several periods, and various details observed such as the rate of bubble growth, maximum bubble radius, surface irregularities on the bubble and the effect of charge shape and casing. High speed motion pictures are also shown of charges close to the surface of the water. Migration of the bubble, its interaction with the water surface and the appearance of cavitation bubbles are demonstrated. (Author)

AD-623 836 Fld. 19/4, 9/2, 4/2
CFSTI Prices: HC $1.00 MF $0.50
TRAVELERS RESEARCH CENTER INC HARTFORD CONN
DATA PROCESSING PLANS FOR BALLISTIC WINDS STUDY.
Quarterly rept. no. 1, 1 Jun-31 Aug 65,
by Frederick P. Ostby. Oct 65, 12p. Contract DA-28-043-AMC-01377 (E) Proj. DA-1VO-2500-A-126-01 ECOM 01377-1
Unclassified report

Descriptors: (*Weather forecasting, Military requirements), (*Data processing systems, Meteorological parameters), (*Meteorological parameters, Exterior ballistics), (*Exterior ballistics, Meteorological parameters), Digital computers, Programming (Computers), Meteorology, Mountains, Atmospheric sounding, Armed forces operations, Artillery units

Detailed computer program specifications were written for a preprocessor to perform various editing and minor calculating functions on a basic set of rawinsonde data. These functions are described. A formulation was made of the several parts of the Conditional Relaxation Analysis Method (CRAM) program that will be used to analyze the data. The procedures for the initial guess, correction, solution of Poisson's Equation by relaxation, and smoothing are discussed. (Author)

AD-623 879 **See Fld. 11/5**

AD-623 888 **See Fld. 11/5**

AD-623 889 **See Fld. 11/5**

AD-623 890 **See Fld. 11/5**

19/5. FIRE CONTROL AND BOMBING SYSTEMS

AD-623 784 Fld. 19/5, 19/6, 5/9
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ANTIAIRCRAFT ARTILLERY SERGEANT'S MANUAL BOOK 2, ANTIAIRCRAFT ARTILLERY OF SMALL AND MEDIUM CALIBER,
by I. I. Kyupar. 1965, 343p. TT 65-64566
Unclassified report

Trans. of mono. Uchebnik Serzhanta Zenitnoi Artillerii. Kniga 2, Strelba Zenitnoi Artillerii Malogo i Srednego Kalibrov, Moscow, 1949.

Availability: Reference only at DDC Hq after original copies exhausted. Not for sale.

Descriptors: (*Antiaircraft gunnery, Instruction manuals), (*Military training, USSR), Military publications, Antiaircraft fire control systems, Artillery, Antiaircraft guns, Antiaircraft ammunition, Ballistics, Military personnel, Artillery units, Training

AD-623 882 Fld. 19/5, 12/1
CFSTI Prices: HC $6.00 MF $1.25
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
TABLES OF OFFSET CIRCLE PROBABILITIES FOR A NORMAL BIVARIATE ELLIPTICAL DISTRIBUTION.
Technical rept.,
by Erwin Biser, and George Millman. Aug 65, 219p. Rept. no. ecom-2625
Proj. DA-1P6-20801-A-187 Task 1P6-20801-A187-01
Unclassified report

Descriptors: (*Tables, Probability), (*Circular error probable, Weapon systems), (*Statistical distributions, Tables), Offset bombing

This report consists of two major parts. The first deals with the development of formulas for computing the probability that a point taken from a normal bivariate elliptical distribution with specified mean and standard deviations shall fall within a circle of given radius whose center is displaced a given distance from the center of the distribution. The second part consists entirely of probability tables. These tables will prove especially useful in dealing with problems involving accuracy studies of weapons systems and with other problems notably in meteorological studies. The events in many practical probability problems are best described by a normal bivariate elliptical distribution with unequal standard deviations. For example, one may be confronted with the problem of evaluating the probability that a missile will hit a circle of a specified radius whose center (aim point) is displaced a given distance from the mean (of impact points) of a normal bivariate elliptical distribution. In this example the impact points are governed by a normal (Gaussian) bivariate elliptical density function; the mean of this distribution is not zero (i.e., the center of the distribution is not about the aim point).

AD-624 053 **See Fld. 9/2**

19/6. GUNS

AD-623 784 **See Fld. 19/5**

20/1. ACOUSTICS

AD-623 865 Fld. 20/1, 20/2, 20/5
CFSTI Prices: HC $2.00 MF $0.50
THOMAS J WATSON RESEARCH CENTER YORKTOWN HEIGHTS N Y
PHONON INTERACTIONS IN CRYSTALS.
Quarterly progress rept. no. 9, 15 May-14 Aug 65,
by N. S. Shiren, M. Pomerantz, and R. J. von Gutfeld. 14 Aug 65, 35p. Contract DA-36-039-AMC-02280 (E) Proj. DA-1P6-22001-A-056
Unclassified report

See also AD-619-273.

Descriptors: (*Phonons, Crystals), (*Masers, Phonons), (*Microwave frequency, Acoustics), Rutile, Harmonic generators, Attenuation, Garnet, Signals, Velocity, Microwave amplifiers, Frequency converters, Anisotropy, Impurities, Indium, Germanium

Measurements of parametric up-conversion in TiO2 show a large anisotropy of the third order elastic constants. A theory of signal velocity for both emission and absorption is presented. Attenuation of microwave phonons due to In impurities in Ge were observed to be similar to that caused by Ga impurities. This was expected from a proposed theory of attenuation by acceptors, although the experimental results are not yet completely understood. Measurements were made of the attenuation of x-band phonons in YIG, and Ga substituted YIG, as a function of temperature. Heat pulses were observed in two more carefully grown single crystals of tin, but, as before, the heat flow was principally a diffusive one with a resulting electron mean free path of 0.005 cm. The thermal relaxation time of thin indium films were measured as a continuous function of temperature. For indium on sapphire, this relaxation time seems to be independent of temperature from 4K to 300K. (Author)

AD-624 136 Fld. 20/1, 17/1
CFSTI Prices: HC $3.00 MF $0.75
NAVY UNDERWATER SOUND LAB NEW LONDON CONN
TABULATIONS OF SLANT RANGE VERSUS HORIZONTAL RANGE FOR BOTTOM-REFLECTED SOUND PATHS,
by Thaddeus G. Bell, and Bernard F. Cole. 7 Oct 65, 78p. Rept. no. usl-Pub-703
Proj. SS041-001-10900 ,USL-1-00-09-00
Unclassified report

Descriptors: (*Range finding, Echo ranging), (*Depth finding, Echo ranging), (*Hydrographic sonar, Depth finding), (*Echo ranging, Depth finding), Underwater sound, Sound transmission, Reflection, Ocean bottom, Acoustics, Sonar

When direct timing methods of determining distances are applied to underwater sound reflected from the ocean bottom, slant ranges are obtained instead of horizontal ranges. This report provides a set of tabulations for the conversion of bottom-reflected slant ranges to horizontal ranges for various water depths. The horizontal range is computed from 0 to 90.2 kiloyards for water depths ranging from 1000 to 3600 fathoms in 200-fathom intervals. (Author)

AD-624 137 Fld. 20/1, 20/4, 9/1
CFSTI Prices: HC $2.00 MF $0.50
NAVY UNDERWATER SOUND LAB NEW LONDON CONN
RADIATION RESISTANCE AND CAVITATION FACTOR OF RECTANGULAR ARRAYS WITH BEAM STEERING,
by Norman T. Chin. 8 Nov 65, 35p. Rept. no. usl-681
Proj. SF-001-03-18 Task 11213
Unclassified report

Descriptors: (*Cavitation, Acoustic impedance), (*Acoustic impedance, Cavitation), (*Hydrophones, Acoustic impedance), Hydrodynamics, Acoustics, Underwater sound, Sound transmission

A large, close-packed, steered array is modeled by imposing a traveling wave along the surface of a rectangular radiator. The results of this report are most pertinent to close-packed arrays made up of elements which are small compared with a wavelength. For this type of array it is shown that at large steering angles the cavitation-limited power is greatly reduced below that achievable at broadside. The cavitation factor is generally less when the beam is steered along the longer side of

an array than when the beam is steered across the shorter side. An integral solution for the radiation resistance for a general steered array is presented. Numerical results show that the radiation resistance has a maximum value at a particular steering angle for a specific array. Expressions of the radiation resistance are derived for an infinitely long rectangular strip with end-fire beam steering across the width and for a finite, slender rectangular array with end-fire beam steering along the longer side. (Author)

AD-623 849 See Fld. 20/5

AD-623 867 See Fld. 20/4

AD-624 050 See Fld. 1/2

AD-624 220 See Fld. 9/3

20/2. CRYSTALLOGRAPHY

AD-623 895 Fld. 20/2, 20/12
CFSTI Prices: HC $1.00 MF $0.50
DELAWARE UNIV NEWARK DEPT OF PHYSICS
X-RAY DAMAGE AND ANNEALING OF THESE DEFECTS IN CDS SINGLE CRYSTALS.
Technical rept.,
by K. W. Boer, J. C. O'Connell, and R. Schubert.
Nov 65, 12p. Rept. no. tr-3
Contract Nonr-4336 (00)
Unclassified report

Descriptors: (*Single crystals, Degradation), (*Cadmium compounds, Sulfides), Crystal lattice defects, X rays, Annealing, Photoconductivity, Electrical properties, Electric currents, Test methods, Semiconductors

The influence of x-ray damage at 250 keV and 300 keV in ultra-high vacuo on the spectral distribution of photoconductivity and conductivity glow curves is described. The observed damage can be explained by assuming a production of sulfur vacancies by x-rays and a later diffusion determined formation of associates of these vacancies with acceptors resulting in recombination centers. The threshold energy for sulfur vacancy formation lies at about 250 keV. (Author)

AD-623 931 Fld. 20/2, 20/3, 11/6
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS MICROWAVE PHYSICS LAB
PHONON GENERATION BY STRIPE-DOMAIN RESONANCE IN PERMALLOY FILMS.
Physical sciences research papers,
by Marden H. Seavey,Jr., and William J. Kearns.
Sep 65, 12p. Rept. no. psrp-143
Proj. AF-4600 Task 4600-03
AFCRL 65-69
Unclassified report

Availability: Published in Journal of Applied Physics V36 N3 PT2 P1205-6 Mar 1965. Copies to DDC users only.

Descriptors: (*Phonons, Iron alloys), (*Iron alloys, Nickel alloys), (*Magnetic resonance, Iron alloys), Microwave frequency, Metal films, Polarization

The generation of microwave phonons by stripe-domain resonance (SDR) in Permalloy films is described. The phonon polarization is mainly longitudinal and this is explained by the orientations of the processing spins in the stripe domains. The phonon echo power behaves similarly to the SDR absorption with dc magnetic field when the field is in the film plane or at an angle to it. The ratio of the echo power out of the cavity to the input power can approach that for the main resonance but is usually from 5 to 10 dB less. (Author)

AD-623 987 Fld. 20/2, 7/4
EATON ELECTRONICS RESEARCH LAB MCGILL UNIV MONTREAL (QUEBEC)
SPIN-LATTICE RELAXATION OF TI (3+) IONS IN RBA1 (SO4)2 12H2O.
Revised ed.,
by Gerald F. Dionne. 1 Jun 65, 7p. Contract DRB-9512-20
Unclassified report

Revision of manuscript submitted 2 Mar 65.

Availability: Published in Physical Review V139 NSA PA1648-54 Aug 30 1965. Copies to DDC users only.

Descriptors: (*Crystal lattices, Spin), (*Relaxation time, Spin), Electron spin resonance, Paramagnetic resonance, Field theory, Titanium, Ions, Single crystals, Cryogenics, Chromium

Spin-lattice relaxation measurements with small concentrations of T (3+) ions in single crystals of RbA1 (SO4)2.12H2O have been carried out between temperatures of 4.2 and 1.6K. The experimental method involved the continuous-wave saturation technique in which comparison was made with a C (3+) impurity of known relaxation time. Over the above temperature range, the values of T varied between 3.3 and 63 msec, indicating Raman behavior at 4.2K. In general, the magnitudes of the relaxation times are much greater than had been expected, and this fact has been explained by applying the Van Vleck theory to the crystal-field model previously reported for this salt. Agreement between theory and experiment is remarkably good at 4.2K, but breaks down at the lower temperatures, where the direct process begins to dominate. Cross relaxation with the Cr (3+) impurity is discussed as a possible explanation for this discrepancy, and a qualitative comparison is made between the relaxation behavior of T (3+) and Cr (3+) ions in the light of current theories of spin-lattice interaction. (Author)

AD-624 067 Fld. 20/2
STANFORD UNIV CALIF DEPT OF PHYSICS
ON ULTRASONIC INVESTIGATION OF PHASE TRANSITIONS,
by M. Papoular. 11 May 65, 2p.
Unclassified report

Availability: Published in Physics Letters V16 N3 P259-60 Jun 1 1965. Copies to DDC users only.

Descriptors: (*Phase studies, Ultrasonic properties), (*Phonons, Phase studies), Magnetostriction, Piezoelectric effect

Ultrasonic propagation is shown to display anomalous properties of relaxation origin if there is a significant coupling between phonons and the long-range order parameter (e. g. magnetostrictive or piezoelectric coupling), even in the absence of intense critical fluctuations (e. g. near first-order phase transitions).

AD-623 806 See Fld. 20/13

AD-623 844 See Fld. 11/6

AD-623 849 See Fld. 20/5

AD-623 865 See Fld. 20/1

AD-623 887 See Fld. 11/2

AD-624 095 See Fld. 20/12

AD-624 140 See Fld. 11/9

AD-624 208 See Fld. 17/5

20/3. ELECTRICITY AND MAGNETISM

AD-623 816 Fld. 20/3, 11/6
CFSTI Prices: HC $3.00 MF $0.50
SHEFFIELD UNIV (ENGLAND) DEPT OF PHYSICS
PARAMAGNETIC RESONANCE OF GADOLINIUM S - STATE IONS IN RARE EARTH METALS.
Final rept.,
by A. M. Harris, and R. S. Tebble. 30 Jun 65, 57p. Contract AF-EOAR-62-54 Proj. 9763 Task 976303
AFOSR 65-1597
Unclassified report

Descriptors: (*Paramagnetic resonance, Gadolinium alloys), (*Gadolinium alloys, Atomic energy levels), Rare earths, Magnetic properties, Metallic crystals, Electron spin resonance, Ferromagnetism, Antiferromagnetism, Absorption spectrum, Lutecium, Yttrium

Electron spin resonance and magnetic susceptibility measurements were made on a series of gadolinium alloys, in the temperature ranges where ferromagnetism, antiferromagnetism, and paramagnetism occur. G factors for the alloys were estimated in the paramagnetic region at high temperatures. The concentration dependence of the g factor of Gd dissolved in several rare earth metals was determined. The results cannot be explained on a simple indirect exchange Yosida model, and covalent mechanisms as suggested by Kondo appear to play an important role. (Author)

AD-624 077 Fld. 20/3, 9/1, 20/14
CFSTI Prices: HC $2.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
ELECTRIC FIELD PATTERNS IN A FERRITE LOADED WAVEGUIDE.
Electrophysics memo.,
by Pietro de Santis. 1965, 45p. Rept. no. pibmri-1281-65
Contract AF49 (638)-1402 AFOSR 65-1719
Unclassified report

Descriptors: (*Waveguides, Electric fields), (*Electric fields, Waveguides), Ferrites, Electromagnetic waves, Propagation, Electromagnetism, Microwaves

A rectangular waveguide loaded with a transversely magnetized ferrite slab is analyzed. The diagram, longitudinal propagation constant vs. distance of the ferrite slab from the side wall, is studied to get some information on the electric field patterns in the crossection of the guide. A numerical case of interest is studied with parameters having values between those used by Barzilai and Gerosa and those by Lax and Button. (Author)

AD-623 739 See Fld. 12/1

AD-623 752 See Fld. 20/7

AD-623 852 See Fld. 20/14

AD-623 906 See Fld. 7/4

AD-623 925 See Fld. 3/2

AD-623 931 See Fld. 20/2

AD-624 078 See Fld. 9/5

AD-624 080 See Fld. 20/14

AD-624 213 See Fld. 7/4

20/4. FLUID MECHANICS

AD-623 714 Fld. 20/4
CFSTI Prices: HC $1.00 MF $0.50
AEROJET-GENERAL CORP DOWNEY CALIF
INVESTIGATION OF THE COALESCENCE OF WATER DROPS.
Interim rept. no. 1, 15 Feb-15 Aug 65,
by G. J. Woffinden. Oct 65, 15p. Rept. no. agc-0937-01 (01)AP
Contract DA28-043-AMC-00497 (E) Proj. DA1V0-14501-B-53A-06 ECOM 00497-1
Unclassified report

Descriptors: (*Water impingement, Electrostatics), (*Nucleation, Water), (*Raindrops, Water impingement), Electrostatic precipitation, Water vapor, Drops, Coagulation, Electrostatic fields, Flow visualization, High-speed photography, Fluid mechanics

An experimental apparatus is being developed for producing droplets 30 to 500 microns in diameter which will impact in mid-air. The coalescence process will be studied with high-speed photography. (Author)

AD-623 740 Fld. 20/4
CFSTI Prices: HC $2.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
NONUNIFORM STEADY FLOW OF AN IDEAL FLUID PAST AIRFOILS. PART III. NUMERICAL RESULTS.
Technical summary rept.,
by J. Weissinger. Jul 65, 39p. Rept. no. mrc-TSR-571
Contract DA-11-022-ORD-2059
Unclassified report

Descriptors: (*Airfoils, Fluid mechanics), (*Fluid mechanics, Numerical analysis), Integral equations, Vortices, Angle of attack

In Parts I and II (AD-610 445 and AD-614 929) theories for nonuniform flow of an exponential type past airfoils were derived. In this part a further improvement to the approximate theory of Part II is developed. The velocity distribution at elliptical profiles of relative thickness 0.1 and 0.2 was computed for angles of attack in the range 0 < or = sin alpha < or = 0.3 and is shown in tables in such a way that the accuracy of the methods can easily be compared. (Author)

AD-623 777 Fld. 20/4
CFSTI Prices: HC $2.00 MF $0.50
CINCINNATI UNIV OHIO DEPT OF AEROSPACE ENGINEERING
STUDIES ON DISSOCIATING GASDYNAMICS. PART 2. HYPERSONIC SMALL PERTURBATION THEORY WITH EQUILIBRIUM DISSOCIATION AND IONIZATION OF AIR FOR BODIES ASSOCIATED WITH POWER LAW SHOCK WAVES.
Technical rept.,
by Ting Y. Li, and Kuo W. Chang. Jul 65, 38p.
Rept. no. tr-AE-6502
Contract AF-AFOSR-416-64A AFOSR 65-0849
Unclassified report

See also AD-620 352.

Descriptors: (*Dissociation, Gas flow), (*Hypersonic flow, Shock waves), (*Gas ionization, Turbulence), (*Perturbation theory, Hypersonic flow), Entropy, Numerical analysis, Thermodynamics, Differential equations, Iterative methods

The inviscid equilibrium hypersonic flow associated with a power-law shock is investigated. Despite the thermodynamic complexity involved in the phenomenon of equilibrium dissociation and ionization of air, the flow in the shock layer is still characterized by the self-similar nature in the zeroth approximation. An analytical formulation is presented for a pure dissociating gas in thermal equilibrium. It is noticed that this formulation includes a system of six ordinary differential equations and can be applied to a pure gas only. Furthermore, the region of uniform validity of these solutions excludes the neighborhood of the body surface because of the effects of the entropy layer. In order to obtain a method which would apply to a mixture of gases and partly take into account the entropy layer effects the locally similar solution approach is proposed. Data from the thermodynamic tables are used to replace the thermodynamic equations necessary for the calculations. Thus a more concise system of equations is obtained. This concept of local similarity is examined both analytically and in terms of numerican accuracy. A numerical example is provided and discussed. (Author)

AD-623 782 Fld. 20/4
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
EXPERIMENTAL AERODYNAMICS,
by A. K. Martynov. 1965, 210p. Rept. no. f-TS-8210/III ,NAD-83329
TT 65-64567
Unclassified report

Trans. of mono. Eksperimentalnaya Aerodinamika, n.p. 1950 p83-8, 126-77, 254-337, 372-90.

Availability: Reference only at DDC Hq after original copies exhausted. Not for sale.

Descriptors: (*Aerodynamics, Scientific research), Wings, Wind tunnels, USSR, Aerodynamic characteristics, Supersonic flow, Force (Mechanics)

AD-623 827 Fld. 20/4
CFSTI Prices: HC $3.00 MF $0.50
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
AERODYNAMICS OF A RECTANGULAR WING WITH A PERIPHERAL JET FOR AIR CUSHION TAKE-OFF AND LANDING.
Technical documentary rept. for May 59-Sep 64,
by K. Dau, B. Etkin, and D. Surry. Sep 65, 57p.
Contract AF33 (657)-8451 Proj. AF-8219
Task 821907
FDL TR-65-59
Unclassified report

Descriptors: (*Wings, Subsonic characteristics), Rectangular bodies, Jets, Ground effect, Wind tunnel models, Model tests, Landings, Take-off, Aerodynamic configurations, Short take-off planes, Stability, Control, Canada

Subsonic wind tunnel experiments on a GETOL wing are reported. The main results relevant to performance, stability and control are presented, and applied to a hypothetical vehicle. Short-field capability is demonstrated to be possible. Stability and control problems are analysed, and shown not to be prohibitive. (Author)

AD-623 867 Fld. 20/4, 20/1
CFSTI Prices: HC $2.00 MF $0.50
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
REFRACTION OF SOUND BY JET FLOW OR JET TEMPERATURE,
by J. Atvars, L. K. Schubert, E. Grande, and H. S. Ribner. May 65, 32p. Rept. no. utias-TN-109
Contract AF-AFOSR-223-64 ,AF-AFOSR-672-64
Unclassified report

Descriptors: (*Jets, Noise), (*Noise, Scattering), Vibration, Refraction, Sound, Gas flow, Temperature, Nozzles, Attenuation, Sources, Frequency, Velocity, Turbulence, Canada, Acoustic properties

The heart-shaped pattern of subsonic jet noise normally peaks somewhere between 15 degrees and 45 degrees from the axis, depending on conditions, falling off sharply as the axis is approached. Conflicting explanations of this directivity pattern appear in the literature. The present investigation suggests that the deep cleft in the pattern can be attributed mainly to refraction of the sound out of the jet by the velocity and temperature fields. The evidence lies in measurements made of the sound field of a harmonic 'point' source placed within a 3/4 in. dia. air jet. The source is the orifice of a tube about 1/16 in. i.d. driven through a conical coupling by a horn-type loudspeaker driver; this radiates sound essentially omnidirectionally up to about 15,000 cps. The experiment established the formation of an axial intensity minimum, which appears to be mainly due to refraction. The depth of the refraction valley increases with jet velocity, jet temperature, and sound frequency; a depth corresponding to an intensity reduction of the order of 35 dB is attained at M = 0.9 for 3000 cps. (Author)

AD-623 868 Fld. 20/4
CFSTI Prices: HC $4.00 MF $1.00
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
THEORY FOR THE FREE MOLECULE IMPACT PROBE AT AN ARBITRARY ANGLE OF ATTACK.
by P. C. Hughes. May 65, 148p. Rept. no. utias-103
Contract AF19 (628)-363
Unclassified report

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Superaerodynamics, Molecular beams), (*Pressure, Probes), Theory, Angle of attack, Gas flow, Tables, Graphics

A theoretical analysis was made of the behaviour of the free molecule impact pressure probe at an arbitrary angle of attack. The solution is formulated in terms of three parameters which represent the tube geometry, the free stream gas velocity and the tube angle of attack to the flow. A drifting Maxwellian motion of the gas molecules entering the tube and diffuse reflection from the tube wall are assumed. Calculations were made for angles of attack up to 90 degrees, for speed ratios from zero to infinity, and for tube geometries varying from an orifice to an infinitely long tube. Graphs and data are presented at the end of the report. (Author)

AD-623 946 Fld. 20/4, 4/2
CFSTI Prices: HC $3.00 MF $0.75
COLORADO STATE UNIV FORT COLLINS FLUID MECHANICS PROGRAM
METEOROLOGICAL-TOWER INDUCED WIND-FIELD PERTURBATIONS.
Technical rept.,
by G. Hsi, and J. E. Cermak. Oct 65, 88p. Rept. no. cer65GH-JEC49
Contract DA-AMC-28-043-64-G9
Unclassified report

Descriptors: (*Weather stations, Towers), (*Towers, Fluid mechanics), (*Fluid mechanics, Towers), (*Wind, Fluid mechanics), Atmosphere, Gas flow, Structures, Perturbation theory, Anemometers, Calibration, Aerodynamics

The objective of this study was to determine how the presence of a typical meteorological tower disturbs the local wind pattern. This study provides data which can be used to correct wind speeds measured by anemometers in the field. Experimental results in this paper are based on data taken upstream of, around, and downstream from a 1:4 scale model of a 20 ft segment of the prototype tower. (Author)

AD-623 974 Fld. 20/4
AERONAUTICAL RESEARCH COUNCIL LONDON (ENGLAND)
MEASUREMENTS OF THE DIRECT PITCHING-MOMENT DERIVATIVES FOR THREE WING PLANFORMS AT HIGH SUBSONIC SPEEDS,
by J. B. Bratt, W. G. Raymer, and J. E. G. Townsend. Nov 53, 39p. Rept. no. arc-R/M-3419
Unclassified report

Availability: Her Majesty's Stationery Office, 135 6D 423 Oxford St., London, England.

Descriptors: (*Aerodynamic configurations, Aerodynamic characteristics), (*Aerodynamic characteristics, Aerodynamic configurations), Pitch (Motion), Moments, Delta wings, Swept wings, Subsonic characteristics, Great Britain

Measurements of the direct pitching damping and stiffness derivatives for a delta and two swept wing planforms made in the N.P.L. 9 1/2 in. High Speed Tunnel are discussed, and results for the delta are compared with theory. Experiments to investigate the cause of loss of damping at low frequencies obtained in earlier tests are also described, and the effect on derivative measurements of random oscillatory flow disturbances is examined.

AD-623 975 Fld. 20/4
AERONAUTICAL RESEARCH COUNCIL LONDON (ENGLAND)
OSCILLATORY AERODYNAMIC FORCES IN LINEARISED SUPERSONIC FLOW FOR ARBITRARY FREQUENCIES, PLANFORMS AND MACH NUMBERS,
by D. J. Allen, and D. S. Sadler. Jan 63, 69p.
Rept. no. arc-R/M-3415
Unclassified report

Availability: Her Majesty's Stationery Office, 135 6D 423 Oxford St., London, England.

Descriptors: (*Supersonic flow, Force (Mechanics)), (*Aerodynamic configurations, Aerodynamic characteristics), Subsonic characteristics, Leading edge, Downwash, Wake, Potential theory, Integration, Numerical analysis, Great Britain

A method is described of performing a numerical integration to solve the integral equation connecting downwash and velocity potential in linearised unsteady supersonic flow. Supersonic and subsonic leading edges and wakes are dealt with, and some practical results are given. By using this approach, a sufficiently general computer programme could deal accurately with kinked and curved edges.

AD-623 980 Fld. 20/4, 14/2
CFSTI Prices: HC $3.00 MF $0.50
GENERAL DYNAMICS/CONVAIR SAN DIEGO CALIF
GAS-SURFACE INTERACTIONS.
Annual rept., 15 Oct 64-14 Oct 65,
by D. McKeown, M. G. Fox, H. R. Poppa, and J. Kay. Oct 65, 56p. Rept. no. gd/c-DBE-65-025
Contract Nonr-3157 (00) Proj. NR-012-403
Unclassified report

Descriptors: (*Molecular beams, Quartz), (*Quartz, Transport properties), Satellites (Artificial), Temperature sensitive elements, Instrumentation, Crystal oscillators, Space probes, Wiring diagrams, Upper atmosphere, Energy, Measurement, Surface properties

A method has been developed for measuring the transfer of energy from a molecular beam to a surface. The method makes use of temperature sensitive Y-cut quartz crystals. A crystal was placed in the beam and the energy transferred to its plating was determined by changes in its oscillating frequency. Crystals having a fundamental frequency of 10 Mc/sec were used and an energy transfer rate of 50 microwatts could be detected. Probe for Measuring Energy Transfer Between a Satellite and the Upper Atmosphere, by D. McKeown, M. G. Fox, and J. Kay: A probe has been developed to measure energy transfer between a satellite surface and the upper atmosphere. Energy transfer is detected by the frequency change of a temperature-sensitive quartz crystal located in the nose of the probe. Transfer rates down to 15 micro W/ sq cm can be measured. Data provided by the probe can be used to determine the accommodation coefficients of surfaces, and periodic variations in the atmospheric density. Results of a satellite flight show that the probe will operate at altitudes up to 500 km where the atmospheric density is still great enough to produce measurable heating.

AD-623 991 Fld. 20/4, 13/10
CFSTI Prices: HC $2.00 MF $0.50
CALIFORNIA INST OF TECH PASADENA HYDRODYNAMICS LAB
MEASUREMENTS ON FULLY WETTED AND VENTILATED RING WING HYDROFOILS,
by A. J. Acosta, E. R. Bate Jr., and T. Kiceniuk. Jun 65, 44p. Rept. no. e-138.1
Contract Nonr-220 (54)
Unclassified report

Descriptors: (*Hydrofoils, Rings), Ventilation, Flow separation, Cavitation, Measurement, Pressure, Water tunnels

Force measurements and visual observations were made in a water tunnel on fully wetted and ventilated flows past a family of conical ring wings having a flat plate section geometry. The diameter-chord ratio was varied from one to three, and the total included cone angle was 12 degrees. The fully wetted flows all exhibited separation from the leading edge except for the largest diameter-chord ratio. The effect of ventilation is to reduce markedly the lift curve slope. Pressure distribution measurements were also made under ventilating conditions for one member of this series. The effect of ventilation over only a portion of the circumference of the ring was also briefly investigated. Large cross forces were developed by such ventilation and some comparisons are made between this method of obtaining control forces and more conventional methods. (Author)

AD-623 998 Fld. 20/4, 13/7, 11/8
CALIFORNIA INST OF TECH PASADENA
DIAPHRAGM PRESSURE TRANSDUCER,
by W. I. Honeywell, and C. J. Pings. 20 Jan 65, 5p. Contract AF49 (638)-1273 ,Nonr-220 (40)
Proj. AF-9710 Task 971003
AFOSR 65-1640
Unclassified report

Availability: Published in Review of Scientific Instruments V36 N6 P754-6 Jun 1965. Copies to DDC users only.

Descriptors: (*Diaphragms (Mechanics), Transducers), (*Transducers, Diaphragms (Mechanics)), (*Pressure gages, Diaphragms (Mechanics)), Fluid mechanics, Hydraulic fluids, Separation

A diaphragm pressure transducer has been developed for the purpose of separating a sample fluid from a hydraulic oil used in a dead weight tester. The diaphragm null position is determined by a commercially available magnetic sensing unit. The null position shifts systematically with absolute pressure, but the shift is reproducible and may be calibrated. With the output scheme utilized, the unit has a sensitivity of 0.00007 atm and a reproducibility of 0.0003 atm. The equipment has been used extensively at pressures up to 70 atm, but as designed should be operable to much higher pressures. The equipment described includes a small injector for refined pressure adjustments. (Author)

AD-623 711 See Fld. 13/10

AD-623 718 See Fld. 20/9

AD-623 859 See Fld. 21/2

AD-623 866 See Fld. 22/1

AD-623 941 See Fld. 4/2

AD-623 942 See Fld. 21/2

AD-624 121 See Fld. 5/1

AD-624 137 See Fld. 20/1

20/5. MASERS AND LASERS

AD-623 807 Fld. 20/5, 9/5
CFSTI Prices: HC $1.00 MF $0.50
WESTINGHOUSE DEFENSE AND SPACE CENTER BALTIMORE MD AEROSPACE DIV
DEVELOPMENT OF MILLIMETER AND SUB-MILLIMETER MASER DEVICES.
Interim rept. no. 8, 1 Jul-31 Oct 65,
by W. E. Hughes, and C. R. Kremenek. Nov 65, 21p. Rept. no. 490H
Contract AF33 (657)-10472
Unclassified report

See also AD-618 066.

Descriptors: (*Masers, Electromagnetic properties), (*Oscillators, Masers), (*Rutile, Masers), Microwave amplifiers, Millimeter waves, Impurities, Iron, Aluminum compounds, Nitrates, Chlorides, X band, Cavity resonators, Pumping (Electronics), Radio receivers, Push-pull amplifiers

The investigation of an iron (Fe (3+)) doped rutile zero field maser amplifier was completed. Further investigations of this device will be conceived with its characteristics as a solid-state oscillator. Experiments to develop a 94-ghz push-pull maser were conducted during this period; however, it was not possible to produce significant net gain because of a lack of sufficient pumping power. Investigation of X-band zero field masers was continued during this period using polycrystalline iron-doped aluminum chloride. (Author)

AD-623 848 Fld. 20/5, 20/6
CFSTI Prices: HC $3.00 MF $0.75
RAYTHEON CO WAYLAND MASS ADVANCED DEVELOPMENT LAB
LASER PUMPING TECHNIQUES STUDY.
Final rept. 1 Oct 64-30 Sep 65,
by Paul A. Silberg. 30 Oct 65, 72p. Contract AF49 (638)-1420 Proj. AF-9768 Task 976802
AFOSR 65-2212
Unclassified report

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Lasers, Pumping (Optical)), (*Pumping (Optical), Lasers), Circuits, Magnetic pinch, Gas ionization, Gas discharges, Electricity, Energy conversion, Electromagnetism, Magnetohydrodynamics, Argon, Spectroscopy, Calorimetry

In the course of the study of laser pumping techniques, Raytheon developed a reliable calorimeter technique to measure the transfer efficiency of the theta pinch in converting capacitively stored electrical energy to electromagnetic energy. It is shown, with the use of circuit measurements, that the efficient theta-pinch circuit decay consists of a two-stage circuit decay and that the inefficient theta pinch consists of a three-stage decay. Using the circuit decay data, a modified transfer efficiency measurement for a two-stage plasma circuit was developed that is approximately as accurate as the calorimeter technique, but very much faster and easier to make. These measurements have been used to evaluate the transfer efficiency of the theta-pinch in Argon at pressures of 2 and 5 Torr with different tube sizes and with different coupling impedances. Measurements have shown a transfer efficiency as high as 59 percent with present measurements. Spectral measurements show that the preionization techniques increase the continuum radiation with the small diameter tubes and are ineffective with the largest diameter tubes used. (Author)

AD-623 849 Fld. 20/5, 20/6, 20/1, 20/2
CFSTI Prices: HC $4.00 MF $0.75
ALBERTA UNIV EDMONTON
DISPERSION EFFECTS IN LASER AMPLIFIERS.
Final scientific rept. 1 Oct 64-30 Sep 65,
by George F. Smith, Wilbur P. Brown Jr., and Concetto R. Giuliano. 30 Sep 65, 108p. Contract AF49 (638)-1439 Proj. AF-9768 Task 9768-02
AFOSR 65-2211
Unclassified report

Descriptors: (*Lasers, Light transmission), (*Light transmission, Atmosphere), (*Phonons, Photons), Mechanical waves, Brillouin zones, Microwave frequency, Optics, Atmospheric motion, Quartz, Diffraction, Interferometers, Perturbation theory, Amplifiers

It has been shown that the Rytov approximation is severely limited in its applicability to long distance optical propagation in the atmosphere. A new and powerful boundary layer calculational technique has been developed and applied to the problem of scattering of electromagnetic waves from convex cylinders near grazing incidence. Multigigacycle acoustic waves were generated in crystalline solids by giant pulse ruby laser radiation; several unsuccessful attempts were made to probe these waves with Bragg-scattered gas laser radiation. However, multiple wavelength shifts in stimulated Brillouin scattering from quartz were observed; it was established, by time resolved interferometry, that these shifts result from an iterative process. (Author)

AD-624 029 Fld. 20/5, 20/6
CFSTI Prices: HC $3.00 MF $0.50
AEROSPACE TECHNOLOGY DIV LIBRARY OF CONGRESS WASHINGTON D C
LASER-INDUCED NONLINEAR OPTICAL EFFECTS: COMPREHENSIVE REPORT.
ATD work assignment no. 71,
by Yuri Ksander. 29 Oct 65, 52p. Rept. no. atd-P-65-74
TT 65-64584
Unclassified report

Review of Soviet papers from 1962-Jun 65. Rept. on Surveys of Soviet Scientific and Technical Literature.

Descriptors: (*Lasers, USSR), (*Optical phenomena, Nonlinear systems), Harmonic generators, Light, Modulation, Raman spectroscopy, Quantum mechanics, Gas ionization, Reports

The report is organized into three chapters. Chapter 1 deals with one category of laser-induced nonlinear effects, multiphoton processes and the generation of harmonics. The amplification and modulation of light in nonlinear media are also discussed in this chapter. Chapter 2 is concerned with another category of nonlinear effects, stimulated Raman scattering (SRS). Chapter 3 reviews recent Soviet research on laser-induced gas breakdown. (Author)

AD-624 099 Fld. 20/5, 20/6
CFSTI Prices: HC $2.00 MF $0.50
TEXAS INSTRUMENTS INC DALLAS APPARATUS RESEARCH AND DEVELOPMENT LAB
LARGE-ANGLE DEFLECTION TECHNIQUE FOR LASER DISPLAY.
Quarterly rept. no. 1,
by G. R. Fournier, and H. W. Parker. Nov 65, 35p. Rept. no. ui-912008-1
Contract AF30 (602)-3731 Proj. AF-5597
RADC TR-65-349
Unclassified report

Descriptors: (*Electrooptics, Lasers), (*Lasers, Display systems), (*Fiber optics, Lasers), Light transmission, Reflectors, Piezoelectric transducers, Deflection, Electron optics, Television display systems, Light communication systems, Optical equipment

A large angle deflection technique for producing a 945-line T.V. type raster scan in an experimental laser display was developed, since conventional deflection methods could not be used. The horizontal scanner was comprised of a rotating mirror and a piezoelectric cartridge, coupled by a glass resonator shaft. A circular scan was generated and then transformed into a linear scan by a fiber optic converter. The use of the fiber optic bundle allowed zero flyback time. The linear beam was then deflected vertically by a galvanometer driven mirror at a 60 cycle per second rate. After vertical scanning, the light beam was projected through a lens on a screen. Circuitry for error sensing feedback for the scanners is continuing under study. (Author)

AD-624 164 Fld. 20/5, 20/12, 20/6
CFSTI Prices: HC $2.00 MF $0.50
KORAD CORP SANTA MONICA CALIF
SOLID STATE LASER DEVICES.
Quarterly progress rept. no. 9,
by R. H. Hoskins, R. C. Pastor, and I. M. Winer. Sep 65, 26p. Contract DA-36-039-AMC-00070 (E) Proj. DA-1P6-22001-A-056
Unclassified report

See also AD-620 685.

Descriptors: (*Lasers, Solid state physics), (*Solid state physics, Lasers), (*Amplifiers, Lasers), Crystals, Yttrium compounds, Aluminum compounds, Garnet, Neodymium, Oxides, Europium, Ytterbium compounds, Erbium, Optics

Toward meeting the objective of developing a solid state laser with an output in the megawatt range and a repetition rate in the kilocycle range, device studies have been conducted on a continuously-pumped Q-spoiled YAG:Nd (;3) laser. The results are reported here, along with an analysis of the behavior of such a system. Material studies on the systems Y2O3:Eu (+3) and YbAG:Er (+3) are also described. (Author)

AD-624 188 Fld. 20/5, 20/10
NEW YORK UNIV N Y
QUANTUM STATISTICAL DYNAMICS OF LASER AMPLIFIERS,
by A. E. Glassgold, and Dennis Holliday. 21 Apr 65, 19p. AROD 4614:3
Unclassified report

Prepared in cooperation with RAND Corp., Santa Monica, Calif.

Availability: Published in Physical Review V139 N6A PA1717-34 Sep 13 1965. Copies to DDC users only.

Descriptors: (*Lasers, Dynamics), (*Quantum statistics, Lasers), Quantum mechanics, Field theory, Operators (Mathematics), Hamiltonian, Equations of motion, Damping, Pumping (Optical), Amplifiers

A quantum statistical procedure for studying interacting radiation fields is developed and applied to a model laser operating as a linear amplifier. The method utilizes an expansion of the density matrix in terms of a complete set of orthogonal operators originally used by Weyl. One mode of the laser field is considered to interact with a pumping mechanism and with a pumping mechanism and with a loss mechanism. A general solution for the density matrix is obtained and then applied to various initial conditions. It is found that a classical statistical interpretation of the results is frequently appropriate. (Author)

AD-623 785 **See Fld. 20/12**

AD-623 865 **See Fld. 20/1**

AD-623 929 **See Fld. 8/4**

AD-624 096 **See Fld. 9/5**

AD-624 102 **See Fld. 20/14**

AD-624 121 **See Fld. 5/1**

AD-624 129 **See Fld. 20/6**

20/6. OPTICS

AD-623 757 Fld. 20/6
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS UPPER ATMOSPHERE PHYSICS LAB
NEW EXCITATION UNIT FOR RARE GAS CONTINUA IN THE VACUUM ULTRAVIOLET.
Interim rept.,
by R. E. Huffman, J. C. Larrabee, and D. Chambers. 12 Jan 65, 14p. Rept. no. instrumentation Papers-82
Proj. AF-8627 Task 8627-01
AFCRL 65-71
Unclassified report

Availaility: Published in Applied Optics V4 N9 P1145-50 Sep 1965. Copies to DDC users only.

Descriptors: (*Gas discharges, Thyratrons), (*Excitation, Helium group gases), (*Light pulses, Pulse generators), Continuous spectrum, Ultraviolet spectroscopy, Optical equipment, Discharge tubes

An excitation unit for vacuum ultraviolet light sources based on a thyratron-controlled modulator has been developed to excite rare gas continua. With this unit the Hopfield helium continuum in the 580-1100 A wavelength region is obtained with improved intensity and stability so that a bandwidth of slightly less than 0.25 A can be used with a 2.2-m normal incidence vacuum monochromator and photoelectric scanning detection. The application of this excitation unit to study of the rare gas continua and to absorption cross-section measurements in hydrogen is illustrated. (Author)

AD-623 920 Fld. 20/6
CFSTI Prices: HC $1.00 MF $0.50
HOLMAN (JOHN F) CO INC WASHINGTON D C
THE SPECTRAL-ENERGY DISTRIBUTION IN THE GROUND-GLASS IMAGE OF A SPHERE ILLUMINATED BY THE SUN, THE SKY AND REFLECTED LIGHT (CONCLUSION),
by M. Nagel. Nov 65, 14p. Rept. no. t-1810-65
Contract DA-44-009-AMC-930 (T) Proj. DA-4-A-025-001-A-854 TT 65-64581
Unclassified report

Trans. of Optik (West Germany) v7 n1 n. p. 1950.

Descriptors: (*Colorimetry, Optical glass), (*Optical glass, Light transmission), (*Camera lenses, Light transmission), (*Light transmission, Optical glass), Absorption spectrum, Optics, Photography, West Germany

The spectral-energy distribution of light reaching the photographic layer through the photographic lenses is investigated in relation to true color reproduction in photographic images.

AD-623 977 Fld. 20/6, 20/10
CARLYLE BARTON LAB JOHNS HOPKINS UNIV BALTIMORE MD
SENSITIVITY OF PR (3+):LACL3 INFRARED QUANTUM COUNTER.
Revised ed.,
by John F. Porter Jr.. 26 Apr 65, 4p. Rept. no. Reprint Series-13
Contract AF33 (657)-11029 ,DA-31-124-ARO (D)-103
Unclassified report

Revision of manuscript submitted 15 Mar 65.

Availability: Published in IEEE Journal of Quantum Electronics VQE-1 N3 P113-5 Jun 1965. Copies to DDC users only.

Descriptors: (*Pumping (Optical), Infrared radiation), (*Electron transitions, Quantum mechanics), Praseodymium, Doping, Lanthanum compounds, Chlorides, Sensitivity, Fluorescence, Atomic energy levels

797-128 O-66—5

The measured noise equivalent power (NEP) and response time of the Pr (3+):LaCl3 Infrared Quantum Counter have been measured for the wavelengths 1.48 microns, 1.58 microns, 2.03 microns, and 2.33 microns at the nominal temperatures of 300K, 77K, and 4.2K. The experimental arrangement is described and suggestions for improvement are made. The best results obtained are an NEP = 0.00002 watts/sq. root (c/s) and a temperature independent response time of 20-30 ms. (Author)

AD-624 086 Fld. 20/6, 12/1
CFSTI Prices: HC $3.00 MF $0.75
UTAH STATE UNIV LOGAN ELECTRO-DYNAMICS LABS
NONLINEAR PHASE CORRECTION OF INTERFEROGRAMS OBTAINED IN FOURIER SPECTROSCOPY.
Scientific rept.,
by Michael L. Forman, W. H. Steele, and George A. Vanasse. 1 Jul 65, 92p. Rept. no. sr-2
Contract AF19 (628)-251 Proj. AF-8658 Task 86580
AFCRL 65-51
Unclassified report

Descriptors: (*Interferometers, Spectroscopy), (*Spectroscopy, Fourier analysis), (*Fourier analysis, Spectroscopy), Integral transforms, Corrections, Phase studies

A review of the theory and techniques of Fourier Spectroscopy is given, and the present state-of-the-art of reducing data obtained by this means is discussed. Certain inherent problems are present in today's methods of reducing the data obtained by Fourier Spectroscopy techniques, the so-called interferogram. They are: (1) In the case of a symmetric interferogram where digital recording is used, the point corresponding to zero path difference may not be recorded. A simple cosine transform of this data leads to incorrect results. (2) In the case of improper compensation of an interferometer, asymmetric interferograms result. The method of reducing these is to pick an approximate center, take a sine and cosine transform about it, and compute the spectrum as the square root of the sum of the squares of the sine and cosine transform respectively. There are two disadvantages to this type of reduction, namely that one requires twice as many points to obtain the same resolution as in the symmetric case, and that the process is non linear with respect to signal-to-noise ratio in the spectrum. A method is proposed which eliminates the above problems, and yields spectral values that are accurate to within one to three percent. It is based on the fact that there is a fixed function of the interferometer, the so-called phase error, and by making suitable use of it, one can obtain a secondary interferogram from the original interferogram which is symmetric about an effective zero path difference, hence only a cosine transform is required. (Author)

AD-624 108 Fld. 20/6
CFSTI Prices: HC $3.00 MF $0.75
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES ENGINEERING CENTER
RESEARCH IN OPTICAL COHERENCE.
Final rept.,
by Robert S. Macmillan, Gregory O. Young, Donald G. Childers, and William K. Pratt. Dec 64, 85p. Rept. no. uscec-102-101-1 EE-34-1
Contract AF-AFOSR-188-64 Proj. AF-9768
AFOSR 65-1690
Unclassified report

See also AD-601 764.

Descriptors: (*Optical phenomena, Scientific research), (*Optical equipment, Optimization), Backscattering, Polarization, Frequency modulation, Communication systems, Pulse code modulation, S-matrix, Field theory, Stochastic processes, Noise

The report consists of three parts; (1) Research in Optical Coherence, (2) A Covariance (Coherency) Matrix for Back-Scattered and Spatial Electromagnetic Noise, and (3) Binary Detection in Optical Polarization and Frequency Modulation Communication Channels.

AD-624 129 Fld. 20/6, 20/5, 20/12
CFSTI Prices: HC $2.00 MF $0.50
ARMY ENGINEER RESEARCH AND DEVELOPMENT LABS FORT BELVOIR VA
CHARACTERISTICS OF GALLIUM ARSENIDE DIODES AS INFRARED RADIATION SOURCES,
by Steve B. Gibson, and Daniel J. Horowitz. Sep 65, 45p. Rept. no. 1831
Proj. DA-1D010501A01309
Unclassified report

Descriptors: (*Diodes (Semiconductor), Infrared radiation), (*Infrared radiation, Diodes (Semiconductor)), (*Gallium alloys, Arsenic alloys), Sources, Optical equipment, Band theory of solids, Lasers, Light pulses, Effectiveness

An investigation of the radiating characteristics of gallium arsenide (GaAs) semiconductor infrared sources, both noncoherent and coherent (laser), was made to determine the progress which has been effected in developing them into practical, infrared sources for Military night-vision applications. The report concludes that these devices show promise, provided that during further research and development, the present rate of progress is maintained, particularly in the area of efficiency and operation at room temperature. (Author)

AD-623 815 See Fld. 17/2

AD-623 837 See Fld. 7/4

AD-623 848 See Fld. 20/5

AD-623 849 See Fld. 20/5

AD-623 871 See Fld. 3/2

AD-623 873 See Fld. 14/2

AD-623 874 See Fld. 14/2

AD-623 876 See Fld. 4/1

AD-624 029 See Fld. 20/5

AD-624 040 See Fld. 11/9

AD-624 099 See Fld. 20/5

AD-624 101 See Fld. 11/6

AD-624 132 See Fld. 9/5

AD-624 164 See Fld. 20/5

AD-624 220 See Fld. 9/3

20/7. PARTICLE ACCELERATORS

AD-623 752 Fld. 20/7, 20/3
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
SUPERCONDUCTING ACCELERATORS,
by P. B. Wilson, and H. A. Schwettman. 1965, 8p. Rept. no. hepl-69
Contract Nonr-225 (67) Proj. NR-022-026
Unclassified report

Availability: Published in IEEE Transactions on Nuclear Sciences P1045-52 Jun 1965. Copies to DDC users only.

Descriptors: (*Superconductivity, Electron accelerators), (*Electron accelerators, Superconductivity), (*Linear accelerators, Superconductivity), (*Cyclotrons, Superconductivity), (*Synchrotrons, Superconductivity), Radiofrequency power, Separation

The application of superconductivity to several devices which conventionally require large amounts of rf power is considered. Design characteristics are given for superconducting electron linacs, cavities for electron synchrotrons, rf separators and microtrons. (Author)

AD-623 776 Fld. 20/7
CFSTI Prices: HC $3.00 MF $0.75
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
A LOW ENERGY NITROGEN ION BEAM.
Technical note,
by R. H. Prince. May 65, 62p. Rept. no. utias-TN-80
Contract Nonr-4073 (00) Proj. RR-009-02-01,NR-061-137
Unclassified report

Descriptors: (*Ion beams, Nitrogen), (*Nitrogen, Ion beams), Focusing, Secondary emission, Electrons, Ion sources, Laboratory equipment, Vacuum apparatus, Optical properties

Apparatus has been constructed for the production of a Nitrogen ion beam (N2+) within the energy range 5 to 30eV. Retarding field analysis of the ion energy distribution of a typical 8eV (nominal) beam reveals a width at half maximum of 0.25eV, 50 percent of the ions being within 0.4eV, and 90 percent within a 1.25eV energy range. Present intensities are of the order 10 to the 9th power ions/sq cm -sec. Estimates of the ion reflection coefficient and secondary electron emission coefficient have been obtained during calibration, at energies sparsely reported in the literature, and are in general agreement with existing data, where available. (Author)

AD-623 802 Fld. 20/7, 9/5
CFSTI Prices: HC $4.00 MF $1.00
RACETRACK MICROTRON GROUP UNIV OF WESTERN ONTARIO LONDON
THEORY AND DESIGN OF A RACE-TRACK MICROTRON WITH APPLICATION TO THE GENERATION OF MILLIMETER WAVES.
Technical rept.,
by Heinrich R. Froelich, and Eric Brannen. Dec 64, 125p. Rept. no. tr-RMG-T-1
Contract AF-AFOSR-297-63 AFOSR 65-1626
Unclassified report

Descriptors: (*Millimeter waves, Generators), (*Electron accelerators, Design), (*Cyclotrons, Electron accelerators), Magnetic fields, Submillimeter waves, Electron beams, Radiofrequency generators, Phase (Electronics), Synchronization (Electronics), Stability, Betatrons, Gain, Focusing

The race-track microtron treated is a four-sector design with homogeneous magnetic fields in the sectors. Synchronism and phase stability are investigated for an energy gain that is variable from 0.5 to 1.0 MeV. Stability of betatron oscillations is examined using the 'hard-edge' approximation for the shape of the magnetic field. The design of a race-track microtron is described, whose basic feature is its adaptability to different pole-piece arrangements. Beam bunching in a microtron permits its application to the generation of millimeter and submillimeter waves. The mechanism causing beam bunching is investigated theoretically. Generation of 8 mm waves using the beam of a conventional microtron is described. (Author)

AD-624 038 See Fld. 20/8

20/8. PARTICLE PHYSICS

AD-623 735 Fld. 20/8, 20/10
MICHIGAN UNIV ANN ARBOR DEPT OF PHYSICS

FIVE-DIMENSIONAL QUASISPIN. EXACT SOLUTIONS OF A PAIRING HAMILTONIAN IN THE J-T SCHEME,
by K. T. Hecht. 8 Apr 65, 24p. Contract Nonr-1224 (15)

Unclassified report

Availability: Published in Physical Review, V139 N4B PB 794-817 Aug 23 1965. Copies to DDC users only.

Descriptors: (*Nuclear spins, Hamiltonian), (*Hamiltonian, Matrix algebra), Quantum mechanics, Nuclear structure, Protons, Neutrons, Nuclear models, Mass number, Perturbation theory, Momentum

The matrix elements of a charge-independent pairing Hamiltonian spanning several single-particle states have been expressed in terms of the matrix elements of the infinitesimal operators of R5, the rotation group in a fivedimensional space. General algebraic expressions for these matrix elements have been calculated for states with reduced isospin t=0, 1/2, and 1, in a scheme in which both nucleon number N and isospin T are good quantum numbers, making it possible to find exact solutions to the chargeindependent pairing Hamiltonian for states with individual level seniorities v < or = 2. Exact solutions are compared with perturbation-theory formulas for some simple models. The results indicate that perturbation theory may be used as a guide to an understanding of the charge-independent pairing interaction in its dependence on N and T. For relatively strong pairing and fixed T, the dependence on nucleon number N is similar to that for configurations of identical nucleons; while for fixed N, the T dependence is given mainly by a term of simple T (T+1) form. (Author)

AD-623 877 Fld. 20/8, 9/2
CFSTI Prices: HC $3.00 MF $0.75
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
PROGRAMS FOR COLLECTIVE NUCLEAR MODEL CALCULATIONS IN DEFORMED EVEN-EVEN NUCLEI,
by J. P. Davidson. 8 Sep 65, 76p. Rept. no. usnrdl-TR-901
Proj. SR-011-01-01 Task 0401

Unclassified report

Descriptors: (*Even-even nuclei, Theory), (*Model theory, Nuclear energy levels), (*Programming (Computers), Nuclear energy levels), (*Nuclear energy levels, Programming (Computers)), Parity, Mathematical prediction

After an outline of current collective model theories of deformed, even-even nuclei, both for positive parity states (quadrupole deformation) and for negative parity states (octupole deformation), a series of FORTRAN II computer programs necessary to calculate relevant physical quantities from these models is discussed. First programs are given which can be used to calculate eigenvectors and eigenvalues of the allowed angular momenta for rigid rotators of either deformation. Then programs are given with which the reduced matrix elements for electric quadrupole transitions can be calculated. These programs use the eigenvectors calculated by the previous set. Finally, programs are given which can be used to calculate the effect of deformation vibrations on the energy levels and the transition ratios. A number of graphs of the complete transition ratios for E2 transitions within positive parity and within negative parity bands are included. (Author)

AD-623 990 Fld. 20/8
CFSTI Prices: HC $1.00 MF $0.50
ILLINOIS UNIV URBANA DEPT OF PHYSICS
THE ENERGY DEPENDENCE OF THE VECTOR FORM FACTOR IN THE K (O)E3 DECAY,
by G. P. Fisher, A. Abashian, R. J. Abrams, D. W. Carpenter, and B. M. K. Nefkens. 1965, 8p. Rept. no. c00-42

Unclassified report

Descriptors: (*Meson reactions, K mesons), Pions, Positions, Neutrinos, Vector analysis

The results on K (o)e3 decays are reported. Form factors are sought for the reaction K (o)e3 to pion (=)+e (+)+ neutrino.

AD-623 999 Fld. 20/8, 12/1
CFSTI Prices: HC $1.00 MF $0.50
ILLINOIS UNIV URBANA
COMPARISON OF SOME SU (6)W PREDICTIONS ON COLLINEAR PROCESSES WITH EXPERIMENT,
by J. D. Jackson. 1965, 20p.

Unclassified report

Descriptors: (*Nuclear resonance, Nuclear particles), (*Meson scattering, Baryons), (*Operators (Mathematics), Nuclear resonance), Nuclear reactions, K mesons, S-matrix, Polarization, Groups (Mathematics)

The comparison with experiment and the discussion establish that straightforward application of SU (6)W and similar symmetries to S-matrix elements is an enterprise unlikely to meet with success, apart from some special situations such as the Johnson-Treiman relations. The most important feature omitted in such attempts is the modifications introduced by the existence of competing channels and the resultant inelasticities of the low partial waves. Perhaps all that can be hoped is that the higher symmetry schemes describe vertices and that dynamical calculations based on such couplings will have some meaning. Some tentative indications of at least partial success in this are found in calculations with the peripheral model including absorption, although no really consistent comparison has yet been made. (Author)

AD-624 028 Fld. 20/8
CFSTI Prices: HC $3.00 MF $0.75
INSTITUTO DE INVESTIGACION AERONAUTICA Y ESPACIAL BUENOS AIRES (ARGENTINA) LABORATORIO DE RADIACIONES
PHENOMENOLOGICAL AND MICROSCOPIC ANALYSIS OF PROPERTIES OF EVEN-EVEN NUCLEI. PART B. COLLECTIVE BEHAVIOUR FROM PARTICLE DYNAMICS.
Interim rept., 15 Mar 65-15 Mar 66,
by Horacio E. Bosch, S. M. Abecasis, and C. A. Heras. Jun 65, 77p. Rept. no. lr-8
Contract DA-ARO-49-092-65-G78 Proj. DA-200 14501B11B

Unclassified report

See also AD-617 942.

Descriptors: (*Even-even nuclei, Nuclear models), (*Nuclear properties, Even-even nuclei), Deformation, Nuclear energy levels, Rotation, Nuclear particles, Potential energy, Nuclear spins, Nuclear moments, Equations of motion, Wave functions

A widening of the applicability of phenomenological models is accompanied by an increase in the number of parameters needed. More fundamental models are then required in order to explain the growing wealth of experimental data. Such models might be classified as semi-phenomenological to distinguish them from more rigorous ones. In addition some attempts to obtain collective coordinates from the particle ones will be briefly described. The aim of these attempts is to provide a foundation both to phenomenological and semiphenomenological models. The large quadrupole moments observed in nuclei with many nucleons outside closed shells have for long been associated with nonspherical mass distributions. Since the common field in which the nucleons move in an independent particle model is built self-consistently from a short-range nucleonnucleon interaction, a non-spherical mass distribution would imply a non-spherical single-particle potential. In actual calculations a common potential of prescribed form is used, generally a harmonic oscillator one. Of course, this potential is probably not more than a good starting approximation to the self-consistent field but this is far more difficult to handle.

AD-624 038 Fld. 20/8, 20/7
CFSTI Prices: HC $3.00 MF $0.75
RACETRACK MICROTRON GROUP UNIV OF WESTERN ONTARIO LONDON
ELECTRON ENERGY MEASUREMENTS OF THE RACETRACK MICROTRON BEAM.
Technical rept.,
by V. Sells, H. Froelich, and E. Brannen. Jan 65, 65p. Rept. no. tr-RMG-T-2
Contract AF-AFOSR-297-63 Proj. AF-9767 Task 9767-02
AFOSR 65-1627

Unclassified report

Descriptors: (*Electron beams, Energy), (*Cyclotrons, Beta-ray spectroscopy), Electron accelerators, Momentum, Millimeter waves, Cyclotron magnets, Magnetic fields, Particle trajectories

The momentum spread in the beam of a racetrack microtron was measured using a high resolution beta ray spectrometer. The design of the semicircular double focusing magnetic spectrometer is described. A method of continuous magnetic field measurement in the spectrometer is discussed. The object and image positions relative to the entrance and exit planes of the spectrometer were calculated. The momentum spread in the electron beam of the accelerator as taken directly from the spectrometer was 0.41% at the half width position (full width at half intensity); 0.62% at half current; 1.28% at 90% current and 1.86% at 100% current. These values may be corrected for the natural line width of the spectrometer whose theoretical base spread was 0.16%. With these corrections the upper limit of the energy spread in the 6.0 MeV beam is 22 keV at half width; 34 keV at half integrated current; 73 keV at 90% current and 110 keV at 100% current level. (Author)

AD-624 041 Fld. 20/8, 4/1, 18/3
CFSTI Prices: HC $7.00 MF $1.50
HARRY DIAMOND LABS WASHINGTON D C
TIME-DEPENDENT NEUTRON TRANSPORT FROM A POINT ISOTROPIC SOURCE AT AN ALTITUDE OF 100,000 FEET,
by George A. Ausman,Jr., and Francis N. Wimenitz. 10 Sep 65, 309p. Rept. no. tr-1305
Proj. HDL-22800

Unclassified report

Descriptors: (*Neutron transport theory, Upper atmosphere), (*Upper atmosphere, Nuclear explosions), Neutron flux, Monte Carlo method, Neutron cross sections, Density, Tables

Results of a Monte Carlo calculation of the neutron fluence and flux density in the vicinity of a point isotropic source at an altitude of 100,000 ft (30.48 km) are presented. The fluence and flux density were obtained at 20 detector locations as functions of time and energy for 12 monoenergetic neutron sources. The variation of atmospheric density with altitude is considered in these calculations. A brief discussion of the dependence of the results on detector location is given. (Author)

AD-624 187 Fld. 20/8, 20/13
WASHINGTON UNIV ST LOUIS MO DEPT OF PHYSICS
NUCLEAR MAGNETIC SUSCEPTIBILITY OF HE3 VAPOR,
by J. E. Opfer, K. Luszczynski, and R. E. Norberg. 15 Mar 65, 7p. Contract DA-ARO (D)-31-124-G564 AROD 2791:6

Unclassified report

Availability: Published in Physical Review V140 N1A PA100-6 Oct 4 1965. Copies to DDC users only.

Descriptors: (*Nuclear magnetic resonance, Helium), (*Helium, Magnetic properties), Vapor pressure, Cryogenics, Equations of state, Kinetic theory, Nuclear spins

Measurements of relative values of the nuclear magnetic susceptibility of He3 vapor were made by a pulsed resonance technique for several values of vapor density at 2 and 3.1K. The results of these measurements show that deviations from Curie's law are considerably smaller than those expected for a perfect Fermi gas. A theoretical expression is derived for the susceptibility at vapor densities sufficiently low that only binary collisions are important; a modification of the calculation of the second virial coefficient is used to evaluate the effect of direct interactions. The susceptibility is related to the difference between two virial coefficients, that of He3 and that calculated for a hypothetical He3 with zero spin. The theoretical results are in good quantitative agreement with the experimental data. They indicate that the perfect-Fermigas theory is not applicable to the calculation of the susceptibility of He3 vapor at low density except at temperatures lower than 0.002K. Moreover, from the theoretical results it is concluded that deviations from Curie's law in the vapor are expected to be less than about 1% whenever higher order collisions do not contribute significantly to the interaction between He3 atoms. (Author)

AD-624 215 Fld. 20/8, 20/10
CFSTI Prices: HC $2.00 MF $0.50
CARNEGIE INST OF TECH PITTSBURGH PA
OSCILLATOR BRACKETS FOR HARTREE-FOCK CALCULATIONS.
Technical rept.,
by Michel Baranger, and K. T. R. Davies. Sep 65, 30p. Rept. no. tr-20
Contract Nonr-760 (15) Proj. NR-024-439
Unclassified report

Prepared in cooperation with Oak Ridge National Lab., Tenn.

Descriptors: (*Hartree-Fock approximation, Nuclear energy levels), (*Nuclear energy levels, Hartree-Fock approximation), (*Matrix algebra, Wave functions), Quantum statistics, Momentum, Harmonic generators

Some explicit formulae are derived for the oscillator brackets occurring in the calculation of nuclear twobody matrix elements. These formulae are especially adapted to the calculation of brackets with low relative angular momentum. There are no restrictions on the radial quantum numbers, which makes this method particularly useful for Hartree-Fock calculations. Estimates are given for the computing time. (Author)

AD-623 722 **See Fld. 18/4**

AD-623 878 **See Fld. 18/4**

AD-623 886 **See Fld. 20/12**

AD-624 030 **See Fld. 20/12**

AD-624 127 **See Fld. 18/4**

20/9. PLASMA PHYSICS

AD-623 718 Fld. 20/9, 20/4, 20/14, 22/3, +
CFSTI Prices: HC $5.00 MF $1.25
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
RESEARCH ON ELECTROMAGNETICS FOR PROJECT DEFENDER.
Semi-annual technical summary rept. for 30 Sep 65,
by Ernst Weber. 30 Sep 65, 198p. Rept. no. pib-mri-1295.1-65
Contract Nonr839 (38) ,ARPA-Order-529
Unclassified report

Descriptors: (*Plasma physics, Electromagnetic waves), (*Electromagnetic waves, Scientific research), (*Hypersonic flow, Electromagnetic waves), Sound, Slot antennas, Shock waves, Stability, Plasma sheath, Cerenkov radiation, Diffraction, Dielectrics, Waveguides, Flow fields, Magnetohydrodynamics, Pattern recognition, Reentry vehicles, Demodulation, Kinetic theory, Electron density

Progress is reported on a fairly large number of projects dealing generally with electromagnetic phenomena in plasmas and plasma-like media, such as the properties of antennas, excitation of electromagnetic waves in plasmas, coupling of acoustic and electromagnetic waves, propagation through time-varying random media, electron densities in shock waves, basic kinetic theory of ionized media, instabilities in plasmas, and properties of laboratory type plasmas. A smaller group of projects deals with characteristics of transmitters and receivers for communication through randomly time-varying media and with the problem of pattern recognition. (Author)

AD-623 812 Fld. 20/9
CFSTI Prices: HC $3.00 MF $0.75
INNSBRUCK UNIV (AUSTRIA) INST FOR THEORETICAL PHYSICS
MAGNETOGASDYNAMIC FLOWS OF SMALL MAGNETIC REYNOLDS NUMBER. PART I.
Scientific rept.,
by Karl Lackner. 29 Jun 65, 54p. Rept. no. sr-27
Contract AF61 (052)-675 Proj. AF-9752 Task 975201
AFOSR 65-1621
Unclassified report

Descriptors: (*Magnetohydrodynamics, Fluid flow), Reynolds number, Two-dimensional flow, Plasma medium, Numerical analysis, Computers, Crossed field devices, Austria

The two-dimensional steady case is investigated for magnetogasdynamic flows of small Reynolds number. A new method is developed for a numerical treatment of the equations for the four real characteristic directions involved. The method is described by illustrating its use in the example of the MGD flow in a steady crossed field accelerator. Results are presented of calculations carried out on a Zuse Z 23V computer. (Author)

AD-623 822 Fld. 20/9
CFSTI Prices: HC $5.00 MF $1.00
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
PLASMA ION SOURCES,
by M. D. Gabovich. 14 Oct 65, 176p. Rept. no. ftd-MT-65-229
TT 65-64563
Unclassified report

Edited machine trans. of mono. Plazmennye Istochniki Ionov, Kiev, 1964 223p.

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Plasma medium, Ion sources), (*Ion sources, Plasma medium), Gas discharges, Atoms, Molecules, Plasma oscillations, USSR

The book is a survey of source material on gasdischarge ionic sources. It includes different types of plasma ionic sources: sources of atomic and molecular ions of hydrogen, multiply charged ions, electrons, and other particles, and also the extraction of ions and primary forming of ion beams, going in a vacuum of quasi-neutral ionic fluxes, the role of oscillatory properties of plasma and others.

AD-623 899 Fld. 20/9, 4/1
BIRMINGHAM UNIV (ENGLAND) DEPT OF ELECTRON PHYSICS
OBSERVATIONS OF IONIC PROCESSES IN GASEOUS AFTERGLOWS.
Final scientific rept.,
by M. J. Copsey, and D. Smith. 31 Jul 65, 84p.
Contract AF-EOAR-74-63 AFCRL 65-82
Unclassified report

Availability: Reference only at DDC Hq after original copies exhausted. Not for sale.

Descriptors: (*Helium group gases, Gas discharges), (*Gas discharges, Gas ionization), (*Gas ionization, Mass spectroscopy), (*Mass spectroscopy, Helium group gases), Ions, Electrons, Density, Mass spectrum, Helium, Neon, Diffusion, Spectrum analyzers, Vacuum apparatus, Langmuir probes, Upper atmosphere, Thermodynamics, Great Britain

Time resolved measurements of ion and electron number densities in inert gas afterglows are described in detail. Inconsistencies between these two types of measurement, and between these and similar measurements by other workers, are shown to be largely removed by improvements in the mass spectrometric technique. The most recent observations in helium and neon in the pressure range 0.15 to 1.0 torr indicate, contrary to the earlier measurements, that three-body mechanisms for the conversion of atomic to molecular ions are dominant. (Author)

AD-623 913 Fld. 20/9, 9/1
CFSTI Prices: HC $2.00 MF $0.50
MICROWAVE ASSOCIATES INC BURLINGTON MASS
EXPLORATORY DEVELOPMENT ON COUPLING SCHEMES FOR PLASMA AMPLIFIERS.
Interim technical rept. no. 1, 1 Jun-1 Sep 65,
by Charles S. Biechler. Sep 65, 30p. Contract AF33 (615)-3052
Unclassified report

Descriptors: (*Plasma medium, Amplifiers), (*Particle beams, Plasma medium), Waveguide couplers, Coupling circuits, Microwave equipment, Electrodes, Partial differential equations

The properties of plasmas which are useful for coupling to beam-plasma amplifiers are discussed. The characteristics of PIG discharge plasmas are reviewed with emphasis on inhomogeneities. A method of solving Maxwell's equations in a right circular cylinder containing an axially inhomogeneous plasma is presented and the design of a universal coupling test vehicle is described. (Author)

AD-623 971 Fld. 20/9, 7/4
CFSTI Prices: HC $1.00 MF $0.50
GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE DIV
MEASUREMENT OF PLASMA DENSITIES BY VACUUM ULTRAVIOLET ABSORPTION SPECTROSCOPY.
Technical information series,
by P. Gloersen, and S. F. Collins. Nov 65, 18p. Rept. no. r65SD29
Unclassified report

Descriptors: (*Plasma physics, Density), (*Absorption spectrum, Plasma physics), (*Ultraviolet spectroscopy, Plasma physics), Vacuum, Electron density, Xenon, Resonance absorption

Plasma densities are usually measured by determining the electron densities by a variety of techniques. Under certain circumstances, it is desirable also to know the identities of the associated ions as well as their densities and location relative to the electrons and to know what and how many neutral atoms and molecules are present. A straightforward means of accomplishing this at least qualitatively is through vacuum ultraviolet absorption spectroscopy, since most ions, atoms, and molecules have their resonance absorption spectrum lines in this region. Quantitative meas-

urements require the knowledge of oscillator strengths and line shapes for the respective resonance lines. Such knowledge is by no means complete, but enough information is available to make this technique a useful one. The general considerations in applying this technique are discussed, along with a numerical example using the 1470A resonance line of xenon. (Author)

AD-624 081 Fld. 20/9, 9/1
CFSTI Prices: HC $2.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
PROBING OF THE DYNAMICAL RESPONSE OF A PLASMA.
Internal memo.,
by Herbert Friedman. Jun 63, 49p. Rept. no. pibmri-1168-63
Contract AF30 (602)-2149 Grant ,AF-AFOSR-62-295 AFOSR 65-1721
Unclassified report

Descriptors: (*Plasma physics, Dynamics), (*Magnetic fields, Plasma physics), Discharge tubes, Plasma oscillations

The dynamical response of a gaseous plasma to the self-induced magnetic fields in a toroid switch tube has been experimentally investigated using a magnetic field probe and a set of excitation current measurements. The magnetic field, experimentally measured, is compared with the representation of the plasma current distribution as an ideal current sheet. The excitation current measurements reveal oscillations in the plasma whose detailed nature, unexplainable by the current sheet model, may yield information on the thermal pressure within the plasma. (Author)

AD-624 154 Fld. 20/9, 20/14
CFSTI Prices: HC $1.00 MF $0.50
CRUFT LAB HARVARD UNIV CAMBRIDGE MASS
RADIATION FROM A CURRENT LOOP IN A COMPRESSIBLE PLASMA.
Interim technical rept.,
by H. S. Tuan. 25 Jun 65, 24p. Rept. no. tr-475
Contract Nonr-1866 (32) Proj. NR-371-016
Unclassified report

Descriptors: (*Plasma medium, Electromagnetic waves), (*Loop antennas, Plasma medium), Plasma oscillations, Damping, Filaments, Vector analysis, Electrons, Ions

The technique of treating radiation problems in twocomponent, warm isotropic plasmas in terms of three orthogonal modes is applied to investigate the radiation characteristics of a circular filamentary current loop with a prescribed current distribution. The cases of a circular loop excited with dipole-mode current at frequencies below the ion plasma frequency is emphasized. Numerical values for the radiated power are obtained for certain interesting ranges of the barameters. (Author)

AD-624 165 Fld. 20/9
CFSTI Prices: HC $2.00 MF $0.50
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
HALL EFFECT IN A COLLISION-DOMINATED GASEOUS PLASMA.
Technical rept.,
by C. L. Chen. 1965, 29p. Rept. no. 65-9E2-511-P1 ,TR-1
Contract Nonr-4725 (00) Proj. NR-099-380
Unclassified report

Descriptors: (*Plasma medium, Hall effect), (*Hall effect, Plasma medium), Electrons, Ions, Recombination reactions, Voltage, Tensor analysis, Diffusion, Density

A theoretical treatment of the Hall voltage developed in a gaseous plasma immersed in a uniform magnetic field is presented. The plasma considered is collision dominated and is confined by parallel planes with insulating walls. The Hall voltage is found to depend on electron-ion volume recombination and on the tensor character of the electron mobility. The cases to be discussed are: (i) negligible diffusion, (ii) negligible electron-ion volume recombination, and (iii) diffusion with small but not negligible volume recombination. (Author)

AD-623 788 **See Fld. 10/2**

AD-623 789 **See Fld. 20/14**

AD-623 803 **See Fld. 3/2**

AD-624 049 **See Fld. 3/2**

AD-624 083 **See Fld. 3/2**

AD-624 102 **See Fld. 20/14**

AD-624 220 **See Fld. 9/3**

20/10. QUANTUM THEORY

AD-623 790 Fld. 20/10, 20/12
CFSTI Prices: HC $1.00 MF $0.50
STANFORD UNIV CALIF DEPT OF PHYSICS
EXPERIMENTS AT LIQUID HELIUM TEMPERATURES ON MACROSCOPIC QUANTUM EFFECTS AND GENERAL RELATIVITY.
Final rept.
7 Aug 65, 6p. Contract AF-AFOSR-62-119
Proj. AF-9767 Task 976704
AFOSR 65-1600
Unclassified report

Descriptors: (*Quantum mechanics, Cryogenics), (*Relativity theory, Cryogenics), Superconductors, Helium, Liquefied gases, Magnetic fields, Vortices

A review is presented of research in the following three areas: (1) preliminary research on the design of a low temperature gyro experiment to check the general theory of relativity by an experiment proposed by L. I. Schiff; (2) quantized flux in superconductors which is found to be in integral units of hc/2e insteady of hc/e; and (3) the scattering of light from He II to see quantized vortices. During this investigation, a superconducting circuit was developed capable in principle of measuring 10 to the -11th power gauss, and the idea of a truly zero magnetic field region was conceived, made possible by the fact of flux quantization in superconductors. (Author)

AD-623 850 Fld. 20/10, 12/1
CFSTI Prices: HC $2.00 MF $0.50
MARYLAND UNIV COLLEGE PARK DEPT OF PHYSICS AND ASTRONOMY
GAUGE PROBLEMS IN CANONICALLY QUANTIZED ELECTRODYNAMICS WITHOUT SUBSIDIARY CONDITIONS.
Technical rept.,
by C. S. Lam. Aug 64, 41p. Rept. no. tr-397
Contract AF-AFOSR-500-64
Unclassified report

Descriptors: (*Field theory, Quantum mechanics), (*Transformations (Mathematics), Field theory), Electromagnetic fields, Invariance, Tensor analysis, Vector analysis, Matrix algebra

Relations between time ordered functions of quantum electrodynamics quantized in different gauges are discussed. (Author)

AD-624 125 Fld. 20/10, 12/1
CFSTI Prices: HC $1.00 MF $0.50
WISCONSIN UNIV MADISON THEORETICAL CHEMISTRY INST
PATH-INTEGRALS IN DYNAMICS,
by A. M. Arthurs. 1 Nov 65, 19p. Rept. no. wis-TCI-132
Contract DA-11-022-ORD-2059 Grant ,NsG-62-275
Unclassified report

Descriptors: (*Quantum mechanics, Integrals), (*Integrals, Quantum mechanics), Dynamics, Field theory, Operators (Mathematics), Wave functions, Hamiltonian

The Lagrangian formulation of quantum dynamics in terms of path-integrals due to Feynman describes systems for which the Hamiltonian is classical in form and quantization is carried out in terms of commutators rather than anticommutators. The difficulty with the Feynman method is the actual evaluation of the pathintegral itself. An explicit evaluation is given for classical wave motion in one dimension. This requires an extension of the Feynman method which was introduced by Tobocman and studied in detail by Davies. The work of Corson on the question of a unified formulation of dynamics is discussed. (Author)

AD-623 735 **See Fld. 20/8**

AD-623 741 **See Fld. 12/1**

AD-623 743 **See Fld. 12/1**

AD-623 767 **See Fld. 12/1**

AD-623 977 **See Fld. 20/6**

AD-624 068 **See Fld. 20/13**

AD-624 188 **See Fld. 20/5**

AD-624 215 **See Fld. 20/8**

20/11. SOLID MECHANICS

AD-623 801 Fld. 20/11
CFSTI Prices: HC $4.00 MF $0.75
ALLIED RESEARCH ASSOCIATES INC CONCORD MASS
GENERAL INSTABILITY OF ORTHOTROPICALLY STIFFENED CYLINDERS. PART I. AXIAL COMPRESSION, TORSION AND HYDROSTATIC PRESSURE LOADINGS.
Final technical rept. Nov 63-Jun 65,
by Roger Milligan, George Gerard, C. Lakshmikantham, and Herbert Becker. Jul 65, 117p.
Rept. no. ara-TR-258-2
Contract AF33 (615)-1228 Proj. AF-1467 Task 146703
FDL TR-65-161-Pt-
Unclassified report

Descriptors: (*Stiffened cylinders, Stability), (*Loading (Mechanics), Stiffened cylinders), Compressive properties, Torsion, Hydrostatic pressure, Elasticity, Failure (Mechanics), Buckling (Mechanics), Structural shells, Aerospace craft, Tests

The general applicability of orthotropic stability theory to aerospace shell structures was examined experimentally. For this purpose a series of careful experiments were performed on orthotropically stiffened cylinders designed to fail in the elastic general instability mode under three separate loading conditions: axial compression, torsion and hydrostatic pressure. Experimental results obtained during the program verified that for all loading conditions considered linear orthotropic theory results in accurate predictions of cylinder strength. As a result of observed discrepancies between experiment and previously existing theory for longitudinally stiffened cylinders under axial compression, theoretical studies were initiated which resulted in the discovery of a new asymmetric failure mode for this cylinder configuration. Based on this new failure mode, good correlation between experiment and theory was obtained except when the longitudinal stiffened cylinder configurations approached that corresponding to an isotropic cylinder. Other theoretical investigations performed during the program established that cylinder boundary conditions have a pronounced effect on the buckling strength of orthotropic cylinders under hydrostatic pressure loading. (Author)

AD-623 810 Fld. 20/11
CFSTI Prices: HC $3.00 MF $0.50
ALLIED RESEARCH ASSOCIATES INC CONCORD MASS
GENERAL INSTABILITY OF ORTHOTROPICALLY STIFFENED CYLINDERS. PART II. BENDING AND COMBINED COMPRESSION AND BENDING.
Final rept.,
by C. Lakshmikantham, George Gerard, and Roger Milligan. Aug 65, 51p. Rept. no. ara-TR-258-3
Contract AF33 (615)-1228 Proj. AF-1467 Task 146703
FDL TR-65-161-Pt-
Unclassified report

See also AD-623 801.

Descriptors: (*Stiffened cylinders, Stability), (*Bending, Stiffened cylinders), (*Compressive properties, Stiffened cylinders), Loading (Mechanics), Buckling (Mechanics), Stresses, Structural shells, Elastic shells

As part of a general program to determine the applicability of linear orthotropic theory to the design of cylindrical shells under various loading conditions, a theoretical and experimental investigation was performed on the general instability of orthotropic cylinders under bending and combined axial compression and bending loading. Based on a simple approximation for the asymmetric buckling pattern, theoretical results suitable for design use were obtained for the buckling of orthotropic cylinders for both bending and combined loading conditions. It was shown that the buckling stress for orthotropic cylinders under bending or axial compression loading are equal which agrees with previous results for isotropic cylinders. Theoretical results were evaluated by means of a series of careful experiments performed on orthotropically stiffened cylinders designed to fail in the elastic general instability mode. For both bending loading and the combined axial and bending loading condition, experimental results were in good agreement with the theory. (Author)

AD-623 917 Fld. 20/11
CFSTI Prices: HC $3.00 MF $0.50
CALIFORNIA INST OF TECH PASADENA DIV OF ENGINEERING AND APPLIED SCIENCE
TRANSIENT ELASTIC WAVES IN ANISOTROPIC PLATES.
Technical rept.,
by R. A. Scott, and J. Miklowitz. Sep 65, 51p. Rept. no. tr-1
Contract Nonr-220 (57) Proj. NR-064-487
Unclassified report

Descriptors: (*Mechanical waves, Propagation), (*Elasticity, Sheets), Boundary value problems, Integral transforms, Anisotropy, Numerical analysis

For some classes of anisotropic media and certain orientations of the axes of symmetry, plane-strain and torsional motions are possible in elastic plates. Using the linear equations of motion, the solutions to several time-dependent boundary value problems which generate such motions are derived, by means of multi-integral transform techniques. The problems considered are (i) sudden symmetric application of normal line loads on the surfaces of an infinite plate; (ii) sudden application of a normal displacement, together with zero shear stress, at the edge of a semi-infinite plate, whose lateral surfaces are stress-free; (iii) sudden application of a normal stress, together with zero lateral displacement, at the edge of a semi-infinite plate, whose lateral surfaces are stress-free and (iv) impulsive torsional loading of the surfaces of an infinite plate by means of concentrated torques. In problems (i), (ii), and (iii), far-field information is obtained by means of a low frequency, small wavenumber approximation, and numerical results are presented for ice, zinc, copper, and several isotropic media for comparison purposes. (Author)

AD-623 958 Fld. 20/11, 13/13
CFSTI Prices: HC $3.00 MF $0.75
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF
LONGITUDINAL WAVE PROPAGATION IN AN ELASTICPLASTIC MEDIUM.
Technical rept.,
by D. T. Liu. Sep 64, 75p. Rept. no. 2-60-64-39
Contract NOw-63-0050-c
Unclassified report

Descriptors: (*Mechanical waves, Propagation), (*Stresses, Solids), Elasticity, Plasticity, Aluminum, Structures, Loading (Mechanics), Differential geometry, Equations of motion, Programming (Computers)

This report is concerned mainly with plane-wave propagation of large amplitude stresses in a medium where motion transverse to the direction of wave propagation is presented. Both the partial differential equations governing the stress-wave propagation and the jump conditions across a shock discontinuity are developed using the basic principles of the conservation of mass, momentum, and energy. The criterion for a stable shock front is discussed, and the wave structure arising, when the criterion is no longer satisfied, is described. The constitutive law is discussed in some detail with particular emphasis on the elastic-plastic behavior of ductile solids. The finite difference method is developed for solving onedimensional shock wave propagation problems with initial and boundary conditions prescribed in terms of pressure or velocity; i.e., arbitrary pressure pulse input, free surface, or an interface between two different media. The operational FORTRAN computer program is described in some detail. Capabilities include predicting the shock wave response, possible bond separation, and spallation failure in a multilayered medium composed of up to four different materials. Sample calculations which serve to illustrate the difference between the hydrodynamic and elastic-plastic behavior of solids under shock compression are also included. (Author)

AD-623 995 Fld. 20/11
DAVID TAYLOR MODEL BASIN WASHINGTON D C
FREQUENCY EQUATIONS FOR THE NORMAL MODES OF VIBRATION FOR A PLATE BOUNDED BY PARABOLIC CYLINDERS WHEN ROTARY INERTIA AND TRANSVERSE SHEAR ARE CONSIDERED.
Final rept.,
by Basil V. Nakonechny, and W. R. Callahan. 29 Nov 65, 16p. Rept. no. dtmb-2110
Unclassified report

Availability: Published in Journal of the Acoustical Society of America V37 N4 P1-12 Apr 1965. Copies to DDC users only.

Descriptors: (*Parabolic bodies, Vibration), (*Vibration, Mathematical analysis), Shear stresses, Inertia, Cylindrical bodies, Frequency, Partial differential equations, Flat plate models

The partial differential equations governing the motion of plates when transverse shear and rotary inertia are considered are solved for plates bounded by parabolic cylinders. Three cases have to be considered, depending on the shape of the plate. They are: CASE I: a plate bounded by two parabolic arcs (v=v1, u=u1, u=-u1); CASE II: a plate bounded by three parabolic arcs (v=v1, v=v2, u=u1, u=-u1); CASE III: a plate bounded by four parabolic arcs (v=v1, v=v2, u=u1, u=-u2). After converting the partial differential equations and boundary conditions into parabolic coordinates, product solutions are assumed and solutions of the resulting ordinary differential equations appear as definite integrals. The eight different types of boundary conditions entering into the theory, for each case, are satisfied by taking linear combinations of products of these definite integrals. The elimination of the arbitrary constants in each boundary problem leads to the frequency equation for the normal modes of vibration. The frequency equations for Case II and Case III are given by determinants of the 12th order equated to zero, whereas for Case I the determinant is of the 6th order. In the classical theory, the frequency equations for Case II and Case III are given by determinants of the 8th order equaated to zero, whereas for Case I a determinant of the 4th order is required. (Author)

AD-624 060 Fld. 20/11
COLUMBIA UNIV NEW YORK DEPT OF CIVIL ENGINEERING AND ENGINEERING MECHANICS
THE ELASTIC BUCKLING OF TAPERED BEAMCOLUMNS.
Technical rept.,
by Donald J. Butler, and George B. Anderson. Jan 63, 11p. Rept. no. tr-1
Contract NBy-24967
Unclassified report

Availability: Published in Welding Journal Research Supplement P1-8 Jan 1963. Copies to DDC users only.

Descriptors: (*Beams (Structural), Buckling (Mechanics)), (*Buckling (Mechanics), Elasticity), Elasticity, Thrust, Bending, Steel, Stresses, Taper, Welding, Tests

Results are presented from a series of tests to determine the elastic buckling strength of taper steel I-beams under pure axial thrust and under combined bending and thrust. The beams, having various amounts of flange and web taper, were fabricated by welding together pieces of steel plate cut to trapezoidal form. The results of the pure thrust tests are in excellent agreement with an exact theoretical solution for the elastic buckling of tapered columns appropriate to the test conditions and specimens employed. The combined load tests indicate an interaction relationship essentially independent of the amount of taper and in good agreement with a theoretical result obtained for beams of uniform cross section. (Author)

AD-624 107 Fld. 20/11
MICHIGAN UNIV ANN ARBOR
PROGRAM ON THE DYNAMIC TESTING OF STRUCTURAL FRAMES AND ARCHES.
Final rept.,
by Bruce G. Johnston. May 60, 68p. Contract NBy-3186
Unclassified report

Design and Planning Studies at Ann Arbor, Mich.

Availability: Reference only at DDC Hq after original copies exhausted. Not for sale.

Descriptors: (*Structural parts, Tests), Dynamics, Blast, Simulators, Loading (Mechanics)

A test program involving welded portal frames, with either hinged or fixed colume bases; together with two hinged arches, is described. The tests are scaled to adapt them to an atomic blast simulator. Recommendations are made as to test assembly, instrumentation, and procedure. Auxiliary equipment is described. Alternate test set-ups with or without dynamometers are designed and relative advantages and disadvantages discussed. Design calculations for the test frames and auziliary equipment are given. (Author)

AD-624 130 Fld. 20/11
CFSTI Prices: HC $1.00 MF $0.50
PITMAN-DUNN RESEARCH LABS FRANKFORD ARSENAL PHILADELPHIA PA
OSCILLATIONS DUE TO A NONLINEAR RESTORING FUNCTION.
Technical research rept.,
by Arnold Leibowitz, Henry Kahn, and Lawrence

P. Grayson. Sep 65, 21p. Rept. no. R-1775
Proj. DA-5B97-01-006

Unclassified report

Descriptors: (*Oscillation, Numerical analysis), Harmonic analysis, Fourier analysis, Oscillators, Equations of motion, Adiabatic gas flow, Nonlinear differential equations

Oscillations of a gas-operated oscillator with restoring force are shown to be similar to the motion of the harmonic oscillator. The effects of a spin field are considered relative to the singularities of the system. An analysis is performed, including the effects of viscous damping and deriving amplitude and frequency as functions of time. (Author)

AD-624 168 Fld. 20/11, 11/9
CFSTI Prices: HC $2.00 MF $0.50
WASHINGTON UNIV SEATTLE DEPT OF MECHANICAL ENGINEERING
TRANSIENT ANALYSIS IN A FRACTURING EPOXY PLATE WITH A CENTRAL CRACK.
Interim technical rept.,
by A. S. Kobayashi, W. B. Bradley, and R. A. Selby. 15 Aug 65, 35p. Contract Nonr-447 (39)
Proj. NR-064-478

Unclassified report

Descriptors: (*Epoxy plastics, Fracture (Mechanics)), (*Fracture (Mechanics), Epoxy plastics), Stresses, Optical analysis, Strain (Mechanics)

Transient displacement distributions in fracturing epoxy plates were determined experimentally in centrally notched epoxy plates of approximately 16' x 4' x 0.2' in size. The Moire fringe method in conjunction with a microflash unit was used to photographically record the transient displacement fields in the fracturing plates. Transient Moire fringe patterns were either scanned by a microdensitometer for accurate determination of the locations of fractional fringes or Westergaard's stress functions were fitted to data points obtained by direct measurements. In most cases, the displacement distributions in the vicinity of the running crack tips varied as the square root of r. The dynamic stress intensity factors for cases considered were approximately 2.3 to 5.5 times the static fracture toughness of the material. Distribution of normal strains in the longitudinal direction, of principal strains, and of maximum shear strains were determined for various crack tip locations in the plates. These results showed qualitative agreement between available theoretical and experimental results for comparable solutions. (Author)

AD-624 197 Fld. 20/11
CFSTI Prices: HC $3.00 MF $0.50
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
ANALYSIS OF REINFORCED CONCRETE THIN SHELLS, A PRELIMINARY STUDY.
Technical note,
by R. R. Craig Jr.. Oct 65, 55p. Rept. no. tn-N-750
Proj. Y-F011-05-04-002

Unclassified report

Descriptors: (*Structural shells, Reinforced concrete), (*Reinforced concrete, Loading (Mechanics)), Stresses, Design, Vibration, Mathematical analysis, Dynamics, Supports, Parabolic bodies

The study is part of a long-range program to obtain information pertinent to the analysis and design of concrete thin shell structures subjected to dynamic loads. A brief bibliography of some of the literature related to this subject is included. The remainder of the report is devoted to the theory of shallow shells. The equations governing the dynamic behavior of shallow shells are derived, and the Galerkin method is employed to obtain a solution for the free vibration of a clamped, elliptic paraboloid shell such as might be used to support the floors in a multistory building. (Author)

AD-623 873 **See Fld. 14/2**

AD-623 874 **See Fld. 14/2**

20/12. SOLID STATE PHYSICS

AD-623 785 Fld. 20/12, 7/4, 20/5
CFSTI Prices: HC $1.00 MF $0.50
HEBREW UNIV JERUSALEM (ISRAEL) DEPT OF PHYSICS
X-RAY EXCITATION OF FLUORESCENCE.
Progress rept. no. 2, 1 Jul-31 Oct 65,
by W. Low. 31 Oct 65, 6p. Contract N62558-4347

Unclassified report

See also AD-620 466.

Descriptors: (*Fluorescence, Excitation), (*X-ray spectroscopy, Fluorescence), (*Nitrogen, Line spectrum), Ruby, Emissivity, Electron transitions, Band spectrum, Photons, Secondary emission, Luminescence, Impurities, Vanadium, Lasers

New lines previously found on bombarding ruby turned out to be from atmospheric molecular nitrogen. These lines were studied in detail and the results are related to similar processes in fluorescing solids.

AD-623 842 Fld. 20/12
CFSTI Prices: HC $6.00 MF $1.25
CARNEGIE INST OF TECH PITTSBURGH PA DEPT OF ELECTRICAL ENGINEERING
STUDIES OF GE-GAAS AND GE-SI HETEROJUNCTIONS.
Interim technical rept.,
by Joseph P. Donnelly. Sep 65, 248p. Contract DA-31-124-ARO (D)-131 AROD 3397:8

Unclassified report

See also AD-622 961.

Descriptors: (*Semiconductors, Tunneling (Electronics)), (*Tunneling (Electronics), Semiconductors), Germanium, Gallium alloys, Arsenic alloys, Silicon, Surface properties, Impurities, Capacitance, Electric currents, Electrical properties, Composite materials

The electrical and photovoltaic characteristics of Ge-GaAs and Ge-Si heterojunctions were investigated. It was found that interface states play an important role in these junctions. Theoretical estimates of the number of interface states indicate that these states have only a secondary effect on the equilibrium band diagram of Ge-GaAs junctions. This was verified by capacitance measurements. On the other hand, interface states completely dominate the band diagram of Ge-Si junctions. Tunneling and recombination currents were found to be the dominant transport mechanism in p-n Ge-GaAs and Ge-Si heterojunctions. The theoretical capacitance of abrupt heterojunctions including the effects of interface states were developed. The results show that interface effects depend on the bulk impurity concentrations and their ratio as well as the density and distribution of interface states. Good agreement was obtained between this theory and experimental results. A frequency dependent capacitance term, which is due to the rate limited charging and discharging of the interface states, was observed on several Ge-Si junctions. Photovoltaic measurements indicate that minority carriers generated in the narrow band gap material recombine at the interface. This effect usually nullifies any advantage obtained from the 'window' effect. (Author)

AD-623 886 Fld. 20/12, 20/8, 7/4
CFSTI Prices: HC $3.00 MF $0.75
MASSACHUSETTS INST OF TECH CAMBRIDGE
SOLID-STATE AND MOLECULAR THEORY GROUP.
Quarterly progress rept. no. 58.
15 Oct 65, 57p. Contract Nonr-1841 (34) Grant, NSF-G24908

Unclassified report

See also AD-617 792.

Descriptors: (*Solid state physics, Reviews), (*Molecular properties, Reviews), (*Hartree-Fock approximation, Electrons), (*X rays, Scattering), (*Gallium, Surface properties), (*Atomic orbitals, Potential theory), Crystals, Aluminum, Copper, Wave functions, Band theory of solids, Integrals, Field theory

Contents: Note on the free-electron exchange approximation, by J. C. Slater; APW calculation of X-ray scattering factors, by F. J. Arlinghaus; Constant energy surface for gallium, by J. H. Wood; Orbital and potential expansions, by E. Ellis and P. Ros.

AD-624 030 Fld. 20/12, 20/8
ILLINOIS UNIV URBANA DEPT OF PHYSICS
OBSERVATION OF CYCLOTRON RESONANCE THROUGH ELECTRON HEATING IN IONIC CRYSTALS AT LOW TEMPERATURE,
by M. Mikkor, K. Kanazawa, and Frederick C. Brown. 6 Aug 65, 3p. Contract SD-131 AROD 4928:1

Unclassified report

Availability: Published in Physical Review Letters V15 N11 PQ552 1-3-3-3 Sep 13 1965. Copies to DDC users only.

Descriptors: (*Cyclotron resonance phenomena, Crystals), (*Solid state physics, Cyclotron resonance phenomena), Potassium compounds, Bromides, Electrons, Heating, Pumping (Electronics), Carriers (Semiconductors), Photoelectric effect

AD-624 055 Fld. 20/12, 9/1
CFSTI Prices: HC $1.00 MF $0.50
GENERAL TELEPHONE AND ELECTRONICS LABS INC BAYSIDE N Y
HOT-ELECTRON MILLIMETER DEVICES.
Quarterly rept. no. 1, 1 Jun-31 Aug 65,
by R. I. Harrison, L. Cohen, F. Drago, D. Fleriand , and R. Socci. Oct 65, 18p. Rept. no. tr-65-726.1
Contract DA-28-043-AMC-00492 (E) Proj. DA-1P6-22001-A-056 Task 04
ECOM 00492-1

Unclassified report

Descriptors: (*Carriers (Semiconductors), Millimeter waves), (*Microwave equipment, Carriers (Semiconductors), (*Millimeter waves, Carriers (Semiconductors)), (*Semiconductor devices, Millimeter waves), Modulators, Mixers (Electronic), Harmonic generators, Detectors, Indium alloys, Antimony alloys, Germanium, Electrons

A program is being conducted to explore the application of known hot-carrier effects in semiconductors to the development of new and improved microwave devices. The devices being investigated include modulators, mixers, harmonic generators, and detectors. An experimental technique was developed for measuring the modulation depth of the hot-carrier amplitude modulator at drive frequencies above 0.5 Gc/s. Typically, modulation indices of 60 and 30 percent were obtained at 0.5 Gc/s and 0.75 Gc/s respectively. The hot-carrier InSb mixer exhibited a minimum detectable signal power of -96 dBm at 70 Gc/s with a local-oscillator drive of -4 dBm at 781K. Third-harmonic power at 210 Gc/s was obtained with a p-type 35 ohm cm Ge hot-carrier unit. Hot-carrier detectors fabricated from 0.5 ohm cm p-type Ge exhibited essentially square-law response for power levels up to 10 mW at 70 Gc/s. The sensitivity of the units is greater than 100 mV/mW. (Author)

AD-624 089 Fld. 20/12, 20/14
CFSTI Prices: HC $4.00 MF $1.00
MICROWAVE LAB STANFORD UNIV CALIF
CONDUCTION PROCESSES, NORMAL MODES, AND DRIFT INSTABILITIES IN BULK SEMICONDUCTORS,
by Tore Wessel-Berg. Nov 65, 146p. Rept. no. ml-1315
Contract AF30(602)-3595 Proj. AF-5573 Task 557303
RADC TR-65-393
Unclassified report

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Carriers (Semiconductors), Propagation), (*Semiconductors, Electrical conductance), Electrons, Motion, Space charges, Diffusion, Electromagnetic fields, Wave transmission, Solid state physics

A general small-signal analysis of wave propagation in semiconductor materials due to drifting majority carriers and electromagnetic fields is presented. The theory is basically independent of details of energy band structure and minority carriers, and is expressed in terms of macroscopic averages of the carrier distributions. The theory is expressed in terms of independent normal modes of wave disturbances in a uniform finite-diameter cylindrical semiconductor. (Author)

AD-624 090 Fld. 20/12, 20/14
CFSTI Prices: HC $2.00 MF $0.50
MICROWAVE LAB STANFORD UNIV CALIF
CARRIER WAVES IN SEMICONDUCTORS,
by Gordon S. Kino. Nov 65, 50p. Rept. no. ml-1353
Contract AF30(602)-3595 Proj. AF-5573 Task 557303
RADC TR-65-347
Unclassified report

Descriptors: (*Carriers (Semiconductors), Propagation), (*Semiconductors, Electrical conductance), Electrons, Electromagnetic waves, Wave transmission, Gain, Attenuation, Solid state physics

Mechanisms for achieving low loss propagating carrier waves in bulk semiconductor are considered. General relationships are derived, and three particular specializations for wave propagation under consideration of boundary conditions imposed by thin samples, and finally an analysis which includes inductive effects in semiconductors and predicts a gain mechanism. (Author)

AD-624 095 Fld. 20/12, 20/2, 9/1
CFSTI Prices: HC $1.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH NJ
CHEMICAL FORMULAE OF MEASURED MATERIALS SHOWING THE PIEZOELECTRIC, ELECTROOPTIC, AND PIEZOOPTIC EFFECTS.
Technical rept.,
by R. Bechmann. Oct 65, 23p. Rept. no. ecom-2631
Proj. DA-1P6-22001-A-058 Task 1P6-22001-A-058-01-29
Unclassified report

Descriptors: (*Piezoelectric crystals, Chemical properties), (*Electrooptics, Materials), Elasticity, Lasers, Dielectrics, Piezoelectric effect

Chemical formulae of the materials for which all or part of the elastic, piezoelectric, dielectric, piezooptic, and electrooptic constants are known and measured are listed.

AD-624 175 Fld. 20/12
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
METALLIC DIAMONDS; PRESSURE-PRODUCED METALS,
by A. J. Darnell, and Williard F. Libby. 1965, 11p. Contract AF-AFOSR-245-63 Proj. AF-9710 Task 971003
AFOSR 65-1657
Unclassified report

Availability: Published in Progress in Solid State Chemistry V2 P1-8 1965. Copies to DDC users only.

Descriptors: (*Metals, High-pressure research), Alloys, Cryogenics, Tin, Indium alloys, Antimony alloys, Tellurium alloys, Tin alloys

The metallic phases of the IVth Group elements and of the binary compounds one and two columns removed from the IVth Group, e. g., boron nitride, aluminum phosphide and zinc selenide are called metallic diamonds. The general nature of the phase diagram is that the melting point of the non-metallic state falls when pressure is applied until the transition pressure is reached; the solid-solid transition to the metallic state then occurs after which the melting point rises again. A technique is described for removing these new materials from the high-pressure apparatus in which they are produced so that their properties can be studied more completely. The technique involves chilling the materials in the metastable form and removing them after pressure is reduced to atmospheric. (Author)

AD-624 189 Fld. 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS
ELECTRON PARAMAGNETIC RESONANCE OF PHOTOEXCITED DONOR-ACCEPTOR PAIRS IN ZINCSULFIDE CRYSTALS,
by H. D. Fair,Jr., R. D. Ewing, and F. E. Williams. 25 Jun 65, 2p. Contract DA-ARO (D)-31-124-G446 AROD 4169:3
Unclassified report

Availability: Published in Physical Review Letters V15 N8 PM542-1-2-2-2 Aug 23 1965. Copies to DDC users only.

Descriptors: (*Paramagnetic resonance, Zinc compounds), (*Zinc compounds, Sulfides), Excitation, Band theory of solids, Cryogenics, Single crystals

Photoexcited electron paramagnetic resonance was observed for ZnS:Cu, Ga single crystals, and was attributed to paramagnetic states of donor-acceptor pairs.

AD-623 759 See Fld. 8/7

AD-623 790 See Fld. 20/10

AD-623 895 See Fld. 20/2

AD-623 906 See Fld. 7/4

AD-623 966 See Fld. 6/11

AD-624 054 See Fld. 7/4

AD-624 101 See Fld. 11/6

AD-624 102 See Fld. 20/14

AD-624 111 See Fld. 9/1

AD-624 121 See Fld. 5/1

AD-624 126 See Fld. 7/4

AD-624 129 See Fld. 20/6

AD-624 164 See Fld. 20/5

AD-624 207 See Fld. 17/5

AD-624 210 See Fld. 7/4

20/13. THERMODYNAMICS

AD-623 806 Fld. 20/13, 20/2
CFSTI Prices: HC $1.00 MF $0.50
LINCOLN LAB MASS INST OF TECH LEXINGTON
ELEMENTS OF THE HIJMANS-DE BOER APPROXIMATION TO ORDER-DISORDER THEORY.
Technical rept.,
by Jurgen M. Honig. 26 May 65, 21p. Rept. no. tr-390
Contract AF19(628)-500 Proj. AF-649L ESD TDR-65-22
Unclassified report

Descriptors: (*Phase studies, Crystal lattices), (*Adsorption, Gases), Matrix algebra, Equations of state, Statistical mechanics, Monomolecular films, Kinetic theory

The Hijimans-de Boer approximation scheme to orderdisorder theory is reviewed, with special reference to its ultimate application in the area of gas adsorption phenomena. The purpose of the exposition is to provide a more detailed description of the derivation and to assist the reader, wherever possible, in visualizing the fundamental scheme by a pictorial approach. (Author)

AD-624 068 Fld. 20/13, 20/10
CALIFORNIA UNIV LOS ANGELES DEPT OF PHYSICS
VORTEX EXCITATIONS IN SUPERFLUID HELIUM,
by P. Pincus, and K. A. Shapiro. 24 May 65, 2p.
Contract Nonr-233 (88)
Unclassified report

Availability: Published in Physical Review Letters V15 N3 PK535 1-2 - 2-2 19 Jul 1965.

Descriptors: (*Helium, Superfluidity), (*Superfluidity, Helium), (*Vortices, Quantum mechanics), Thermodynamics, Cryogenics, Excitation

The concept of quantized rectilinear vortex excitations in rotating Helium II is extended to transverse modes.

AD-624 113 See Fld. 7/4

AD-624 147 See Fld. 13/1

AD-624 181 See Fld. 7/4

AD-624 187 See Fld. 20/8

20/14. WAVE PROPAGATION

AD-623 765 Fld. 20/14
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
ELECTROMAGNETIC WAVE PROPAGATION IN AN HOMOGENEOUS TRANSVERSELY ANISOTROPIC MEDIUM.
Technical summary rept.,
by G. S. S. Avila. Jul 65, 12p. Rept. no. mrc-TSR-570
Contract DA-11-022-ORD-2059
Unclassified report

Descriptors: (*Electromagnetic waves, Propagation), Field theory, Partial differential equations, Tensor analysis

Maxwell's equations in the special case of a homogeneous, transversely anisotropic medium are considered. It is shown that two-dimensional problems can be conveniently treated in terms of a scalar potential. The field generated by sources in the absence of boundaries is examined. (Author)

AD-623 789 Fld. 20/14, 20/9
CFSTI Prices: HC $3.00 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS MICROWAVE PHYSICS LAB
WAVE PHENOMENA IN IONIZED GASES.
Physical sciences research papers,
by Richard E. Haskell, and Robert J. Papa. Aug 65, 53p. Rept. no. psrp-130
Proj. AF-5635 Task 563503
AFCRL 65-64

Unclassified report

Descriptors: (*Plasma medium, Wave transmission), (*Electromagnetic waves, Plasma medium), Gas ionization, Magnetohydrodynamics, Wave functions, Propagation, Plasma physics

The propagation of waves in uniform, unbounded magneto-plasmas is reviewed. Emphasis is placed on describing the various approaches and plasma models which may be used. The results and limitations of the different methods are discussed and compared. Dispersion curves for each model are presented in the form of omega-k plots. (Author)

AD-623 852 Fld. 20 4, 20/3
CFSTI Prices: HC $3.00 MF $0.75
MICHIGAN UNIV ANN ARBOR RADIATION LAB
LOW FREQUENCY SOLUTION OF THREEDIMENSIONAL SCATTERING PROBLEMS.
Scientific rept.,
by R. E. Kleinman. Aug 65, 58p. Rept. no. 7133-4-T ,SR-2
Contract AF19 (628)-4328 Proj. AF-5635 Task 563502
AFCRL 65-63

Unclassified report

Descriptors: (*Electromagnetic waves, Scattering), (*Potential theory, Field theory), Vector analysis, Power series, Boundary value problems, Electromagnetic wave reflections

A deficiency is pointed out in Stevenson's method of reducing the solution of electromagnetic scattering problems to a succession of standard potential problems whose solutions determine terms in the low frequency expansion of the scattered field. An alternate approach is presented, for perfectly conducting scatterers, which not only removes the difficulty but also is simpler and more explicit than Stevenson's method. The details of the analogous, though simpler, scalar scattering problems are also presented. (Author)

AD-623 986 Fld. 20/14, 4/1
DEFENCE RESEARCH TELECOMMUNICATIONS ESTABLISHMENT OTTAWA (ONTARIO) COMMUNICATIONS LAB
AN F1 LAYER MUF PREDICTION SYSTEM FOR NORTHERN LATITUDES,
by L. E. Petrie, and E. E. Stevens. 3 Nov 64, 7p.

Unclassified report

Availability: Published in IEEE Transactions on Antennas and Propagation VAP13 N4 P542-6 Jul 1965. Copies to DDC users only.

Descriptors: (*Ionospheric propagation, Radio waves), (*Radio waves, Ionospheric propagation), Ionosphere, Electron density, Mathematical prediction, Solar disturbances, Ionospheric disturbance, Radiofrequency interference

Ionospheric propagation via the F1 layer is important for transmission distances in the 2000-3400 km range. Existing prediction systems yield large discrepancies between the predicted and observed F1 layer maximum usable frequencies (MUFs). An improved F1 layer prediction system has been developed which can be used for predicting the F1 layer MUF for latitudes greater than 40 degrees North. Contour maps of zero distance F1 layer MUF and distances factors, for use with any sunspot number, are included for the prediction of the F1 layer MUF for April, June, August, and October. (Author)

AD-624 080 Fld. 20/14, 9/5, 20/3
CFSTI Prices: HC $1.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
MINIMUM-SCATTERING ANTENNAS.
Memo. rept.,
by Walter K. Kahn, and Herbert Kurss. 7 Apr 64, 12p. Rept. no. pibmri-1215-64 ,M-96
Contract AF-AFOSR-453-63 ,NSF-GP-2761
AFOSR 65-1726

Unclassified report

Descriptors: (*Antenna radiation patterns, Electromagnetism), (*Electromagnetism, Antenna radiation patterns), Electromagnetic waves, Modulation, Scattering, Antenna components, Antenna arrays, Antennas

Antennas with identical patterns differ to the extent in which they modify an incident wave, i.e., in the amount they scatter. An antenna is completely described by an (infinite dimensional) scattering matrix. The concept of a minimum scattering antenna introduced by Dicke is generalized to include antennas with a finite number of accessible waveguide ports and with non-reciprocal components. A canonical minimum scattering antenna is defined as one which becomes 'invisible' when the accessible waveguide terminals are open circuited. Such an antenna is shown to be unique once the independent radiation patterns have been specified. Neither an impedance nor an admittance matrix for such an antenna exists. The physical significance of the minimum scattering antenna concept is examined from several points of view. Appropriate generalizations of Dicke's results are derived for multiport and non-reciprocal antennas. The 'scattered power', is introduced as a convenient measure of scattering. It is demonstrated, for a large class of antennas, that the scattered power is quite generally greater than the absorbed power, equality being attained for minimum scattering antennas of this class. This result further justifies the minimum-scattering terminology. Arrays of canonical antennas are discussed briefly. (Author)

AD-624 102 Fld. 20/14, 20/5, 20/9, 20/12
CFSTI Prices: HC $1.00 MF $0.50
MICROWAVE LAB STANFORD UNIV CALIF
INTERACTION OF MICROWAVES WITH MATTER.
Final technical rept. 1 May 63-30 Sep 64,
by M. Chodorow, and H. J. Shaw. Aug 65, 23p. Rept. no. ml-1357
Contract AF-AFOSR-322-63 AFOSR 65-1694

Unclassified report

Continuation of Contract AF49 (638)-1429.

Descriptors: (*Plasma physics, Electromagnetic waves), (*Microwaves, Scientific research), (*Lasers, Solid state physics), Reports, Perturbation theory, Mathematical models, Doppler effect, Crystals, Ferromagnetism

Contents: A perturbation method for waves in timevarying plasma; Radiation from plasma oscillations in inhomogeneous plasmas; Optical spectroscopy of laser materials; Frequency multiplication and amplification using doppler shift methods in solids; Theoretical studies in solid state physics; Transient behavior of solid state lasers; Thermomagnetic phenomena in the quantum region.

AD-624 109 Fld. 20/14
YALE UNIV NEW HAVEN CONN
HARMONIC GENERATION IN A MICROWAVE DISCHARGE,
by Brian Murphy. 8 Jan 65, 7p. Contract Nonr-609 (51)

Unclassified report

Availability: Published in the Physics of Fluids V8 N8 P1534-40 Aug 65. Copies to DDC users only.

Descriptors: (*Microwaves, Production), (*Harmonic analysis, Microwaves), Microwave frequency, Perturbation theory, Radiofrequency power, Direct current, Frequency multipliers

The first two harmonics generated in a microwave discharge in which a weak dc field is present are calculated. The mechanism by which harmonics are generated is assumed to be a modulation of the electron collision frequency by the microwave field. The second harmonic is strongest at a pressure for which the collision frequency is well below the frequency of the perturbing microwave field. The third harmonic is strongest when the collision frequency is approximately equal to the frequency of the microwave field. These results are found to be in reasonable agreement with the observations of Uenohara. (Author)

AD-623 718 **See Fld. 20/9**

AD-623 729 **See Fld. 17/4**

AD-623 753 **See Fld. 3/2**

AD-624 077 **See Fld. 20/3**

AD-624 089 **See Fld. 20/12**

AD-624 090 **See Fld. 20/12**

AD-624 154 **See Fld. 20/9**

AD-624 166 **See Fld. 17/3**

AD-624 191 **See Fld. 17/9**

21/2. COMBUSTION AND IGNITION

AD-623 846 Fld. 21/2, 21/9.1, 21/4
CFSTI Prices: HC $2.00 MF $0.50
DYNAMIC SCIENCE CORP SOUTH PASADENA CALIF
AFOSR CONTRACTORS' MEETING ON LIQUID PROPELLANT ROCKET AND AIR-BREATHING COMBUSTION RESEARCH (17TH), PASADENA, CALIFORNIA, JULY 6-8, 1964.
8 Jul 64, 34p. Contract AF49 (638)-1151 Proj. AF-9711 Task 9711-01
AFOSR 64-0258

Unclassified report

Descriptors: (*Combustion, Symposia), (*Liquid rocket propellants, Combustion), Air-breathing engines (Unconventional), Rocket motors (Liquid propellant), Stability, Abstracts, Propulsion, Combustion products, Detonation waves, Gases

Abstracts of 26 papers are presented.

AD-623 847 Fld. 21/2, 21/9.1, 21/8.1
CFSTI Prices: HC $3.00 MF $0.75
DYNAMIC SCIENCE CORP MONROVIA CALIF
COMBUSTION INSTABILITY.
Final technical rept.
1965, 77p. Rept. no. sn-1800
Contract AF49 (638)-1151

Unclassified report

Descriptors: (*Combustion, Stability), (*Injectors, Design), Drops, Energy, Liquid rocket propellants, Rocket motors (Liquid propellant), Combustion chambers, Fluid dynamic properties, Mathematical analysis

The principal objective of the program was to relate combustion stability to injector design variables through a consideration of droplet dynamics and combustion. The basic model treats the indivi-

dual droplets as energy and mass sources. Stability or instability is determined by the relationship between energy and mass addition and the characteristics of the chamber or of a disturbance introduced into the chamber. Depending upon such relationships, a disturbance will be either amplified or dumped. A determination of the stability of a system will depend not only upon the frequency esponse of the energy and/or mass source but may also depend upon its spatial relationship. One of the first efforts in the study was to determine whether propellant droplets would assume specific patterns with respect to a distrubance and whether these patterns could affect the stability of the combustion process.

AD-623 859 Fld. 21/2, 7/4, 20/4
CFSTI Prices: HC $2.00 MF $0.50
AEROJET-GENERAL CORP SACRAMENTO CALIF SOLID PROPELLANT RESEARCH OPERATIONS
ON THE EXTINCTION OF OPPOSED-JET DIFFUSION FLAMES: A PHYSICAL CRITERION FOR EXTINCTION,
by R. F. Chaiken. 1965, 32p. Contract AF49 (638)-851 AFOSR 65-1625

Unclassified report

Descriptors: (*Jet flames, Quenching (Inhibition)), (*Flames, Reaction kinetics), Jet mixing flow, Theory, Laminar flow, Velocity, Gas flow, Fuels, Oxidizers, Diffusion, Aerodynamic characteristics, Stagnation point

A physical criterion for the extinction of opposed-jet diffusion flames is presented. This criterion, when used in conjunction with the Spalding Theory of mixing in opposed-gas jets, enables the apparent flame strength to be related to (1) the effective maximum chemical reaction rate in the opposed-jet flame, and (2) the laminar flame speed of an equivalent pre-mixed diffusion flame. The derived relationships differ somewhat from similar relationships given by Spalding's earlier theoretical treatment of the phenomena in the thin-flame approximation, but do yield quantitatively similar results when compared with experimental data reported for opposed-jet diffusion flames involving oxidation of simple hydrocarbons and ammonia. (Author)

AD-623 942 Fld. 21/2, 7/4, 20/4
CFSTI Prices: HC $6.00 MF $1.25
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
THERMODYNAMIC AND COMPOSITION DATA FOR CONSTANT-VOLUME COMBUSTION OF STOICHIOMETRIC MIXTURES OF HYDROGEN-OXYGEN DILUTED WITH HELIUM OR HYDROGEN,
by Andre Benoit, and John Galipeau. Aug 65, 203p. Contract AF33 (657)-7874 Proj. AF-7065 Task 706501
ARL 65-17

Unclassified report

Prepared in cooperation with National Computing Services, Toronto (Canada).

Availability: Microfiche only after original copies exhausted.

Descriptors: (*Combustion, Tables), (*Hydrogen, Combustion), (*Oxygen, Combustion), (*Combustion gases, Thermodynamics), Helium, Dissociation, Nonlinear differential equations, Temperature, Pressure, Molecular weight, Specific heat, Concentration (Chemistry), Water vapor

The equilibrium thermodynamic properties of the burned gases resulting from complete combustion at constant volume of a hydrogen-oxygen stoichiometric mixture diluted with an excess of hydrogen or helium have been computed for a wide range of initial pressures (from 1 to 10,000 atmospheres), assuming no dissipative effects. For the initial mixtures represented by the formula (2 + m)H2 + O2 + nHe, a computer program written in FORTRAN II for a 7090 IBM computer was utilized, and was convenient for the computation of the post-combustion properties for any set of values of m and n within the ranges 0 < or =m < or = 6 and 0 < or = n < or = 16. The problem leads to a complete system of nine algebraic non-linear equations. Outputs are provided for the following quantities: Final temperature and final-to-initial temperature ratio, final pressure and final-to-initial pressure ratio, final molecular weight, specific heat at constant pressure of the frozen composition combustion products, frozen composition specific heat ratio of the combustion products, final frozen composition speed of sound, final-to-initial speed of sound ratio, number of moles in burned gases per mole of oxygen in initial mixture, final-to-initial mole number ratio, molar concentration of H2O, OH, H2, O2, H, O and He in the burned gases.

AD-623 860 See Fld. 19/1

21/4. FUELS

AD-623 846 See Fld. 21/2

21/5. JET AND GAS TURBINE ENGINES

AD-623 843 Fld. 21/5
CFSTI Prices: HC $6.00 MF $1.25
GARRETT CORP LOS ANGELES CALIF AIRESEARCH MFG DIV
FLOW DISTRIBUTION STUDY FOR A ROTARY REGENERATOR.
Final rept. 22 Sep 64-21 Jun 65,
by H. H. Walters, and S. T. Jakubowski. Oct 65, 245p. Rept. no. 1-9492
Contract AF18 (600)-2788

Unclassified report

Descriptors: (*Gas turbine regenerators, Gas flow), Rotor blades (Turbomachinery), Heat exchangers, Configuration, Heat transfer, Density, Distribution, Aerodynamic characteristics

The study provides an evaluation by means of analysis and experimentation for achieving proper flow distribution to highly compact surface densities - densities in excess of 2000 sq. ft/cu. ft. Heat transfer matrix analyses were performed to give an indication of the face area requirements and flow lengths for representative rotary regenerator applications. Aerodynamic analyses were conducted to establish the optimum ratio between hot and cold gas rotary regenerator frontal areas. Aerodynamic analyses were performed to derive preliminary contoured shape configurations to give uniform distribution through the selected matrices. These analyses provided preliminary concepts for an experimental program. Definition of an experimental program included design and fabrication of all necessary experimental laboratory hardware, heat transfer matrices and the necessary flow directing devices along with proper implementation of required instrumentation. The experimental air flow runs were conducted using plain screen matrices, i.e. matrices without flow directing devices, which had air face to air frontal area ratios as follows: 1: 1, 3:1, 6:1, and 9:1. Each run provided experimental data for three or more different air flow rates. Further experimental air flow runs were conducted using above cited matrices in conjunction with 25 different vane configurations. Again each run provided data for 3 or more different air flow rates. A computer program was established to reduce experimental data and to plot curves. (Author)

AD-624 094 Fld. 21/5, de/p.
CFSTI Prices: HC $3.00 MF $0.75
RAND CORP SANTA MONICA CALIF
AIRCRAFT TURBINE ENGINES: DEVELOPMENT AND PROCUREMENT COST,
by A. Frank Watts. Nov 65, 83p. Rept. no. rm-4670-PR
Contract AF49 (638)-700

Unclassified report

Descriptors: (*Aircraft engines, Costs), (*Turbojet engines, Costs), (*Turboprop engines, Costs), Turbines, Armed forces procurement, Afterburners

An examination of the development and procurement cost of aircraft turbine engines. The results are based on the history of 14 engines costing approximately $8 billion. Engine size and quantity in addition to institutional and environmental influences bear on the cost estimates. This study is intended primarily for those involved in long-range planning exercises on manned military aircraft employing air-breathing engines. (Author)

AD-624 091 See Fld. 13/7

AD-624 145 See Fld. 1/3

21/8. ROCKET MOTORS AND ENGINES

AD-623 898 See Fld. 14/2

21/8.1 LIQUID ROCKET MOTORS

AD-623 847 See Fld. 21/2

21/9. ROCKET PROPELLANTS

AD-624 190 Fld. 21/9
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF
AN EXPERIMENTAL EVALUATION OF THE PERFORMANCE OF CRYOGENIC GASEOUS HYDROGEN AS A MONOPROPELLANT,
by I. millett, and C. R. Nelson. 1965, 7p. Contract nas8-5600

Unclassified report

availability: Published in Advances in Cryogenic Engineering V10 P360-6 1965.

Descriptors: (*Monopropellants, Hydrogen), (*Gaseous rocket propellants, Hydrogen), (*Hydrogen, Cryogenics), Performance (Engineering), Vaporization, Propellant tanks, Spacecraft nuclear propulsion, Two-phase flow, Nozzles, Thrust

the main propulsion system of the Saturn V nuclear upper stage (S-N stage) is liquid hydrogen. Vehicle system optimization for this stage resulted in a propellant tank insulation design which permitted significant quantities of boiloff. The existence of auxiliary propulsion requirements suggested the possible use of boiloff-fed thrust nozzles to supply secondary propulsion needs with minimum additional weight penalty and maximum reliability. Other cryogenic-fueled upper stages and spacecraft may be considered for cryogenic gaseous-hydrogen boiloff auxiliary propulsion application. However, before a preliminary design could be made for this type of propulsion application, a knowledge of the attainable level of specific impulse (i.e., ratio of pounds of thrust per pound per second of propellant) for hydrogen boiloff gas, expanded through a thrust nozzle to vacuum, was necessary. Consequently, a test program, limited in scope to probable S-N stage requirements, was initiated to assess experimentally the performance of saturated gaseous hydrogen as a monopropellant in conical nozzles over a representative range of area ratio and operating at nozzle-inlet temperatures near 37R and the pressures of about 16 psia. Particular attention was given to the observation of condensation and two-phase flow on nozzle performance. (Author)

21/9.1 LIQUID ROCKET PROPELLANTS

AD-623 846 **See Fld. 21/2**

AD-623 847 **See Fld. 21/2**

22/1. ASTRONAUTICS

AD-623 866 Fld. 22/1, 1/2, 20/4, 14/2
CFSTI Prices: HC $6.00 MF $1.25
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
AEROSPACE RESEARCH ANNUAL PROGRESS REPORT, 1965.
Oct 65, 220p.

Unclassified report

Descriptors: (*Astronautics, Scientific research), Reports, Plasma physics, Fluid mechanics, Fluid dynamic properties, Shock waves, Energy conversion, Aerodynamics, Noise, Subsonic flow, Aerodynamic configurations, Materials, Upper atmosphere, Molecular beams, Surfaces

Contents: Mechanics of rarefied gases, Plasma dynamics, Hypersonic gasdynamics and blast wave phenomena, Energy conversion, Aerodynamic noise, Subsonic Aerodynamics, Aerospace Flight Dynamics, Materials Science and Structures, Upper Atmospheric Research, Molecular Beams and Surface Interactions, Industrial and Architectural Aerodynamics, List of UTIAS publications.

AD-624 118 Fld. 22/1
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
BOOK REVIEW: SPACE PROBES AND PLANETARY EXPLORATION,
by William Corliss. Nov 65, 4p. Rept. no. p-3269

Unclassified report

Descriptors: (*Space probes, Reviews)

22/2. SPACECRAFT

AD-623 896 Fld. 22/2
CFSTI Prices: HC $1.00 MF $0.50
ARMY BALLISTIC MISSILE AGENCY REDSTONE ARSENAL ALA
A COMPARISON OF SOME ACTUATION METHODS FOR ATTITUDE CONTROL OF SPACE VEHICLES,
by Walter Haeussermann. 10 Nov 59, 23p. Rept. no. dg-TN-63-59

Unclassified report

Prepared for presentation to the National Symposium on Manned Space Stations, Los Angeles, Calif., 20-22 Apr 60.

Descriptors: (*Attitude control systems, Spacecraft), (*Spacecraft, Attitude control systems), (*Actuators, Attitude control systems), Acceleration, Flywheels, Gyroscopes, Design, Rotation

The manifold individual attitude control requirements of each particular space vehicle are confronted with a great variety of actuation methods for attitude control which are available today, or which seem to be feasible in the near future. The paper describes the different actuation methods and presents system characteristics such as control mode data and control torques in view of their contribution to weight, power, volume, and lifetime considerations for the space vehicle. Thus, a comparison of several solutions is possible, which is important for the selection of either one specific method in a particular case of application or of two or more methods which supplement each other for a maximum overall system performance. (Author)

AD-624 124 Fld. 22/2, 13/1
CFSTI Prices: HC $3.00 MF $0.75
ROCKETDYNE CANOGA PARK CALIF SPACECRAFT ENGINE DIV
INVESTIGATION OF A MOVING BELT RADIATOR.
Quarterly progress rept.
Nov 65, 73p. Rept. no. R-6289-2
Contract AF33 (615)-2813 Proj. BPSN-5
(633145-62405214)

Unclassified report

See also A -611 574.

Descriptors: (*Radiators, Spacecraft), Antifriction bearing, Feasibility studies, Conveyers, Space envirnmental conditions, Materials, Compatibility, Heat transfer, Molybdenum, Foils, Tungsten, Textiles, Carbon, Graphite, Molybdenum alloys, Rhenium alloys, Tantalum, Welds, Joints, Stainless steel, Tin

The report covers the second quarter of a continuing research program on the feasibility of the moving belt radiator, a novel concept for the rejection of waste heat in space. The chief concerns of the program are materials compatibility, thermal conduction between surfaces, and antifriction bearing operation (all at high temperature in a hard vacuum), and the dynamic behavior of the belt, roller, and drum system under simulated in-flight conditions. During this report period, the materials compatibility and heat transfer investigations in the reciprocating-contact testers and the small-scale model were continued; and the bearing investigation was continued with the performance of seven tests of size 204 bearings. The fabrication of the pilot model for dynamic simulation of in-flight operation is nearing completion, and the design of the 1/5-scale dynamic model is in progress. (Author)

AD-623 797 **See Fld. 17/5**

AD-624 088 **See Fld. 8/14**

22/3. SPACECRAFT TRAJECTORIES AND REENTRY

AD-624 218 Fld. 22/3, 17/7
CFSTI Prices: HC $3.00 MF $0.75
AERONAUTICAL RESEARCH ASSOCIATES OF PRINCETON INC N J
A STUDY OF TIME-OPTIMAL RENDEZVOUS IN THREE DIMENSIONS (VOL. I).
Final rept. 15 Apr 63-15 Apr 64,
by Bernard H. Paiewonsky, and Peter J. Woodrow. Jan 65, 86p. Rept. no. arap-69-Vol-1
Contract AF33 (657)-11319 Proj. AF-8219
Task 821904
AFFDL TR-65-20-Vol-

Unclassified report

Descriptors: (*Rendezvous trajectories, Optimization), (*Terminal guidance, Rendezvous trajectories), (*Optimization, Time), Thrust, Fuel consumption, Boundary value problems, Equations of motion, Multivariate analysis, Rendezvous guidance, Control, Programming (Computers), Functional analysis, Orbital trajectories

The results of a study of time optimal rendezvous in three dimensions with bounds on the rocket thrust and the available propellant are described. The equations of motion are linearized and Neustadt's method is used to solve the two-point boundary value problem in the seven-dimensional state space. Three convergence acceleration schemes are studied. Examples of terminal rendezvous paths are presented and discussed in terms of the magnitudes of the bounds on thrust and fuel. The dependence of terminal errors on initial measurement errors in position and velocity is also discussed. The range of initial values include position errors up to 25 miles and relative velocity errors of 200 ft/sec. The thrust accelerations of the rockets are on the order of 1 ft/sec-sq; the propellant bounds (ideal characteristic velocities) range between 600 ft/sec and 250 ft/sec. (Author)

AD-624 219 Fld. 22/3, 17/7
CFSTI Prices: HC $3.00 MF $0.75
AERONAUTICAL RESEARCH ASSOCIATES OF PRINCETON INC N J
A STUDY OF TIME-OPTIMAL INTERCEPT IN TWO DIMENSIONS (VOL II).
Final rept., 15 Apr 63-15 Apr 64,
by Bernard H. Paiewonsky, and Peter J. Woodrow. Jan 65, 70p. Rept. no. arap-69-Vol-2
Contract AF33 (657)-11319 Proj. AF-8219
Task 821904
AFFDL TR-65-20 Vol-

Unclassified report

Descriptors: (*Intercept trajectories, Optimization), (*Terminal guidance, Intercept trajectories), (*Optimization, Time), Thrust, Boundary value problems, Equations of motion, Interceptor spacecraft, Control, Gravity, Satellites (Artificial), Proportional navigation, Miss distance

A planar time-optimal formulation is used to study the terminal phase of interception above the atmosphere in a uniform gravitational field. The dependence on initial conditions of the optimal steering angle is examined for initial relative velocities ranging from 5,000 ft/sec to 50,000 ft/sec and initial distances up to 500,000 ft. Results are presented in graphical form for two typical rockets showing: (1) the range dependence of terminal error sensitivities to errors in measurements of initial conditions taken along the initial rectilinear coasting path and (2) the variation in these terminal error coefficients along optimal interception paths. Some interceptions with proportional control systems were made and compared with the optimal paths. (Author)

AD-623 718 **See Fld. 20/9**

IDEP

AD-623 890 **See Fld. 11/5**

AD-623 904 **See Fld. 18/8**

AD-623 947 **See Fld. 11/4**

AD-624 094 **See Fld. 21/5**

How To Use Indexes To TAB Portion Of

U. S. GOVERNMENT RESEARCH AND DEVELOPMENT REPORTS

SUBJECT INDEX

The Subject Index is arranged alphabetically by asterisked descriptors from the document announcements in the TAB. Each announcement contains one or more asterisked descriptors which identify the main subjects of the report. The asterisked descriptor may or may not have a modifying descriptor appearing directly below the asterisked descriptor. Under each descriptor entry in the Subject Index appear the following items of information: annotation, AD number, and field/group. A typical subject index entry is shown below.

*ALUMINUM
GLASS TEXTILES
INVESTIGATION OF GLASS-METAL COMPOSITE MATERIALS
AD-619 773 FLD. 11/7

PERSONAL AUTHOR INDEX

The Personal Author Index is arranged alphabetically by the last names of the authors of reports. When several report entries are given for one author, the entries are arranged numerically by AD number. Field/group and titles are also listed. Three asterisks serve as a separator between entries for reports under the same author. A typical personal author entry is shown below.

*CHASE, JOHN W.
* * *
THE LANTHANUM, EUROPIUM, AND DYSPROSIUM CONTENTS OF TWO TEKTITES
AD-619 828 FLD. 8/7
* * *
A PROCEDURE FOR GEOCHEMICAL INTERPRETATION OF TERRESTRIAL RARE-EARTH ABUNDANCE PATTERNS
AD-619 834 FLD. 8/7

CORPORATE AUTHOR-MONITORING AGENCY INDEX

The Corporate Author-Monitoring Agency Index is arranged alphabetically by corporate authors and monitoring agencies.

In the corporate author entry for each document are listed the originator of the report, the originator's report number, the title, AD number, and field/group. If the source has listed a monitoring agency in the report, the monitor acronym and monitor series number are given in parenthesis directly under the title. An IDEP (Interservice Data Exchange Program) report number is presented in the same way. A typical corporate author entry is shown on the next page.

797-565 O - 66 - 8

*AEROJET- GENERAL CORP AZUSA
CALIF

* * *

TR3015
STUDY OF THE REACTION
OF PENTABORANE WITH HYDRAZINE
AND SUBSTITUTED HYDRAZINES
(AFOSR 65-1058)
AD-619 513 FLD. 7/4

The three asterisks serve as a separator between entries for reports under the same corporate author.

When a report lists a monitoring agency, a corresponding entry is provided under the name of the monitoring agency, which appears in alphabetical order among the corporate author entries. In a monitoring agency entry, the report number is given above the title in place of the originator's report number. A typical monitoring agency entry is shown below.

*AIR FORCE OFFICE OF SCIENTIFIC
RESEARCH WASHINGTON D C

* * *

65-1058
STUDY OF THE REACTION
OF PENTABORANE WITH HYDRAZINE
AND SUBSTITUTED HYDRAZINES
AD-619 513 FLD. 7/4

CONTRACT INDEX

The Contract index is arranged alphanumerically by contract number. Within a contract grouping, each entry contains corporate author, series number (if any), monitor number (if any), AD number, and field/group.

When there are multiple document entries under one contract number, entries are arranged by AD number under each corporate author represented.

A contract entry may also contain a letter F, A, or S on the left-hand margin, indicating that the document is a Final, Annual, or Summary report. A typical contract entry is shown below.

*AF19 628 5167
LINCOLN LAB MASS INST OF TECH
LEXINGTON
(ESD TDR-65-315)
AD-619 580 FLD. 9/5
(ESD TDR-65-309)
AD-619 708 FLD. 3/1

REPORT NUMBER INDEX

The Report Number Index lists identifying numbers assigned either by the document originators or by the sponsors of the work described in the documents. The AD number and Field/Group location in TAB are given for each report number. If both the originator and the sponsor of a document have assigned identifying numbers, listings for both will appear in the respective alphanumeric positions.

In certain cases accession numbers are also given with the corresponding AD numbers and TAB locations; for instance, the IDEP (Interservice Data Exchange Program) reports and the CFSTI-TT reports (Technical Translations from the Clearinghouse for Federal Scientific and Technical Information).

CCL-183	
AD-620 154	FLD. 11/9
CRSR-203	
AD-620 250	FLD. 3/1
DPS-1677	
AD-469 558	FLD. 19/1A

AD-FIELD INDEX

The AD-Field Index is arranged numerically by AD number and lists the field/group where the full entry can be located in TAB.

SUBJECT INDEX

The fields/groups indicated here apply only to the Technical Abstract Bulletin Section (on white paper).

REPRINT: AN EXPERIMENTAL EVALUATION OF THE PERFORMANCE OF CRYOGENIC GASEOUS HYDROGEN AS A MONOPROPELLANT.
AD-624 190 FLD, 21/2

*ABSORPTION SPECTRUM
PLASMA PHYSICS
MEASUREMENT OF PLASMA DENSITIES BY VACUUM ULTRAVIOLET ABSORPTION SPECTROSCOPY.
AD-623 971 FLD, 20/9

*ABSORPTION SPECTRUM
NITROGEN COMPOUNDS
INFRARED ABSORPTION IN HEATED AIR FROM VIBRATION-ROTATION BANDS OF NITRIC OXIDE.
AD-623 837 FLD, 7/4

*ACETONES
CHEMICAL ANALYSIS
REPRINT: LIGNIN MODEL COMPOUNDS. DETECTION OF 1HYDROXY-1-(4-HYDROXY-3-METHOXYPHENYL) -2-PROPANONE IN THE ACIDOLYSIS PRODUCTS OF LIGNIN.
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*ACETYLCHOLINE
NEUROMUSCULAR TRANSMISSION
REPRINT: NEUROMUSCULAR TRANSMISSION WITH SPECIAL REFERENCE TO MYASTHENIA GRAVIS.
AD-624 010 FLD, 6/16

*ACOUSTIC IMPEDANCE
CAVITATION
RADIATION RESISTANCE AND CAVITATION FACTOR OF RECTANGULAR ARRAYS WITH BEAM STEERING.
AD-624 137 FLD, 20/1

*ACRYLIC RESINS
MEMBRANES
GLYCERYL METHACRYLATE HYDROGELS.
AD-623 984 FLD, 6/5

*ACRYLIC RESINS
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HYDROGELS OF POLY(HYDROXYETHYL METHACRYLATE) AND HYDROXYETHYL METHACRYLATE - GLYCEROL MONO-METHACRYLATE COPOLYMERS.
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AD-623 896 FLD, 22/2

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ADAPTIVE TECHNIQUE FOR ON-LINE STEADY-STATE OPTIMIZING CONTROL.
AD-624 157 FLD, 12/2

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AD-623 974 FLD, 20/4

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AD-623 975 FLD, 20/4

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MEASUREMENTS IN A THERMAL BOUNDARY LAYER: ATMOSPHERIC PARAMETER SIMULATION.
AD-623 901 FLD, 4/2

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•ATOMIC ENERGY LEVELS
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•RACETRACK MICROTRON GROUP UNIV OF WESTERN ONTARIO LONDON

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•RENSSELAER POLYTECHNIC INST TROY N Y CORROSION RESEARCH LAB

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MICROWAVE ASSOCIATES INC BURLINGTON MASS
AD-623 913 FLD. 20/9

•AF33(616)-5986 GRANT
NOYES CHEMICAL LAB UNIV OF ILLINOIS URBANA
AD-624 170 FLD. 11/9
AD-624 171 FLD. 11/9

•AF33(657)-9629
DUKE UNIV DURHAM N C DEPT OF ANATOMY
(AAL-TR-64-35)
AD-624 042 FLD. 6/5

•AF33(657)-7874
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
(ARL-65-174)
AD-623 942 FLD. 21/2

•AF33(657)-8384
MASSACHUSETTS INST OF TECH CAMBRIDGE ENGINEERING PROJECTS LAB
DSR-9159-2

(APL-TDR-64-82)
F AD-624 091 FLD. 13/7

•AF33(657)-8951
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
(FDL-TR-65-59)
AD-623 827 FLD. 20/4

•AF33(657)-9619
RAND CORP SANTA MONICA CALIF
RM-3727
AD-623 820 FLD. 18/3

•AF33(657)-10472
WESTINGHOUSE DEFENSE AND SPACE CENTER BALTIMORE MD AEROSPACE DIV
490M
AD-623 807 FLD. 20/5
REPRINT SERIES-13
AD-623 977 FLD. 20/6

•AF33(657)-11319
AERONAUTICAL RESEARCH ASSOCIATES OF PRINCETON INC N J
ARAP-69-VOL-1
(AFFDL-TR-65-20-VOL-1)
F AD-624 218 FLD. 22/3
ARAP-69-VOL-2
(AFFDL-TR-65-20 VOL-2)
F AD-624 219 FLD. 22/3

•AF33(657)-11718
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS LAB OF AVIATION PSYCHOLOGY •
(AMRL-TR-65-162)
AD-624 174 FLD. 5/10

•AF41(609)-2005
TEXAS UNIV AUSTIN
(SAM-TR-65-313)
AD-623 968 FLD. 6/18

•AF41(609)-2296 GRANT
CORNELL UNIV ITHACA N Y DEPT OF ZOOLOGY
(AAL-TR-64-36)
AD-624 043 FLD. 6/3

•AF41(609)-2329
CALIFORNIA UNIV LOS ANGELES BRAIN RESEARCH INST
(AMRL-TR-65-142)
F AD-623 786 FLD. 6/20

•AF41(657)-323
TEXAS CHRISTIAN UNIV FORT WORTH INST OF BEHAVIORAL RESEARCH
(AAL-TR-65-5)
AD-624 044 FLD. 6/19
RM-4645-PR
AD-623 938 FLD. 9/2
RM-4670-PR
AD-624 094 FLD. 21/5
RM-4800-PR
AD-624 123 FLD. 12/1
RM-4740-PR
AD-624 133 FLD. 9/2
RM-4544-PR
AD-624 139 FLD. 15/7

•AF49(638)-851
AEROJET-GENERAL CORP SACRAMENTO CALIF SOLID PROPELLANT RESEARCH OPERATIONS
(AFOSR-65-1625)
AD-623 859 FLD. 21/2
(AFOSR-1622)
AD-623 860 FLD. 19/1

•AF49(638)-913
MAREMONT CORP PASADENA CALIF RESEARCH DIV
(AFOSR-65-1691)
F AD-624 087 FLD. 7/3

•AF49(638)-1151
DYNAMIC SCIENCE CORP MONROVIA CALIF
SN-1800
F AD-623 847 FLD. 21/2
DYNAMIC SCIENCE CORP SOUTH PASADENA CALIF
(AFOSR-64-0258)
AD-623 846 FLD. 21/2

•AF49(638)-1194
UNIVAC BLUE BELL PA
TECHNICAL STATUS-5
(AFOSR-65-1702)
AD-624 241 FLD. 5/2

•AF49(638)-1272 GRANT
STANFORD UNIV CALIF DEPT OF CHEMISTRY
(AFOSR-65-1635)
AD-624 006 FLD. 7/3

•AF49(638)-1273
CALIFORNIA INST OF TECH PASADENA
(AFOSR-65-1640)
AD-623 998 FLD. 20/4
CALIFORNIA INST OF TECH PASADENA DIV OF CHEMISTRY AND CHEMICAL ENGINEERING
(AFOSR-65-1638)
AD-623 996 FLD. 7/4
(AFOSR-65-1637)
AD-624 002 FLD. 7/4

•AF49(638)-1291
ILLINOIS UNIV URBANA DEPT OF PSYCHOLOGY
TR-2
(AFOSR-65-1519)
AD-624 034 FLD. 5/10

•AF49(638)-1344
BUREAU OF SOCIAL SCIENCE RESEARCH INC WASHINGTON D C
(AFOSR-65-1890)
AD-623 841 FLD. 5/4

•AF49(638)-1355
MIDWEST APPLIED SCIENCE CORP LAFAYETTE IND
LGO-838
AD-623 759 FLD. 8/7

•AF49(638)-1402
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
PIBMRI-1281-65
(AFOSR-65-1719)
AD-624 077 FLD. 20/3

•AF49(638)-1418
GENERAL ELECTRIC CO ITHACA N Y ELECTRONICS LAB
(AFOSR-65-1728)
F AD-624 242 FLD. 15/2

•AF49(638)-1420
RAYTHEON CO WAYLAND MASS ADVANCED DEVELOPMENT LAB
(AFOSR-65-2212)
F AD-623 848 FLD. 20/5

•AF49(638)-1439
ALBERTA UNIV EDMONTON
(AFOSR-65-2211)
F AD-623 849 FLD. 20/5

•AF49(638)-1478
COLUMBIA UNIV NEW YORK ELECTRONICS RESEARCH LABS
R-3/321
AD-624 132 FLD. 9/5

•AF49(638)-1599 GRANT
STANFORD UNIV CALIF DEPT OF GENETICS
IRL-1030
(AFOSR-65-1632)
F AD-624 074 FLD. 6/1

•AF61(052)-378
MANCHESTER UNIV (ENGLAND) DEPT OF ASTRONOMY
(AFCRL-65-772)
F AD-623 871 FLD. 3/2

•AF61(052)-400
MANCHESTER UNIV (ENGLAND) DEPT OF ASTRONOMY
(AFCRL-65-772)
F AD-623 871 FLD. 3/2

•AF61(052)-657
OBSERVATORIO CENTRAL GEOFISICO TOLEDO (SPAIN)
AD-624 173 FLD. 8/11

•AF61(052)-675
INNSBRUCK UNIV (AUSTRIA) INST FOR THEORETICAL PHYSICS
SR-27
(AFOSR-65-1821)
AD-623 812 FLD. 20/9

•AF61(052)-685
LIEGE UNIV COINTE-SCLESSIN (BELGIUM) INSTITUT D'ASTROPHYSIQUE
TN-2
(AFCRL-65-822)
AD-623 872 FLD. 3/2

•AF61(052)-762
ROYAL INST OF TECH STOCKHOLM (SWEDEN) DEPT OF PHYSICS
SR-2
(AFCRL-65-823)
AD-623 870 FLD. 7/3

•AF61(514)-1127
OSLO UNIV (NORWAY)
NEUROPHYSIOLOGICAL LAB
(AFOSR-2742)
AD-624 011 FLD. 5/10

•AF-AFOSR-34-63
IDAHO UNIV MOSCOW DEPT OF CHEMISTRY
(AFOSR-65-1655)
AD-624 169 FLD. 7/3
(AFOSR-65-1654)
AD-624 177 FLD. 7/3

•AF-AFOSR-61-61
CALIFORNIA UNIV LOS ANGELES SPACE BIOLOGY LAB
(AFOSR-65-1586)
AD-624 014 FLD. 6/5

•AF-AFOSR-62-95
DELAWARE UNIV NEWARK CENTER FOR RESEARCH ON SOCIAL BEHAVIOR
(AFOSR-65-1582)
AD-624 012 FLD. 5/10

•AF-AFOSR-62-114
STANFORD UNIV CALIF DEPT OF CHEMISTRY
(AFOSR-65-1635)
AD-624 006 FLD. 7/3

•AF-AFOSR-62-119
STANFORD UNIV CALIF DEPT OF PHYSICS
(AFOSR-65-1600)
F AD-623 790 FLD. 20/10

•AF-AFOSR-62-133
PENNSYLVANIA UNIV PHILADELPHIA DEPT OF PHYSIOLOGY
(AFOSR-65-1508)
AD-624 005 FLD. 6/16

•AF-AFOSR-62-295
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
PIBMRI-1277-65
(AFOSR-65-1492)
F AD-623 793 FLD. 9/3
PIBMRI-1133-63
(AFOSR-65-1720)
AD-624 078 FLD. 9/5
PIBMRI-1168-63
(AFOSR-65-1721)
AD-624 081 FLD. 20/9

•AF-AFOSR-62-303
LAMONT GEOLOGICAL OBSERVATORY
PALISADES N Y
AD-624 176 FLD. 8/4

•AF-AFOSR-118-63
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF CHEMISTRY
(AFOSR-65-1693)
F AD-624 163 FLD. 8/1

•AF-AFOSR-139-63
CALIFORNIA UNIV BERKELEY
ELECTRONICS RESEARCH LAB
ERL-65-12
AD-624 075 FLD. 9/5

•AF-AFOSR-188-64
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES ENGINEERING CENTER
USCEC-102-101-1 EE-34-1
(AFOSR-65-1690)
F AD-624 108 FLD. 20/6

•AF-AFOSR-223-64
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
UTIAS-TN-109
AD-623 867 FLD. 20/4

•AF-AFOSR-245-63
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
(AFOSR-65-1657)
AD-624 175 FLD. 20/12

•AF-AFOSR-297-63
RACETRACK MICROTRON GROUP UNIV OF WESTERN ONTARIO LONDON
TR-RMG-T-1
(AFOSR-65-1626)
AD-623 802 FLD. 20/7
TR-RMG-T-2
(AFOSR-65-1627)
AD-624 038 FLD. 20/8

•AF-AFOSR-322-63
MICROWAVE LAB STANFORD UNIV CALIF
ML-1357
(AFOSR-65-1694)
F AD-624 102 FLD. 20/14

•AF-AFOSR-415-63
COMMUNICATION RESEARCH INST MIAMI FLA
(AFOSR-65-1602)
F AD-623 814 FLD. 6/3

•AF-AFOSR-416-64A
CINCINNATI UNIV OHIO DEPT OF AEROSPACE ENGINEERING
TR-AE-6502
(AFOSR-65-0849)
AD-623 777 FLD. 20/4

•AF-AFOSR-453-63
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
PIBMRI-1160-63
(AFOSR-65-1722)
AD-624 079 FLD. 9/1
PIBMRI-1215-64
(AFOSR-65-1726)
AD-624 080 FLD. 20/14

•AF-AFOSR-500-64
MARYLAND UNIV COLLEGE PARK DEPT OF PHYSICS AND ASTRONOMY
TR-397
AD-623 850 FLD. 20/10

•AF-AFOSR-602-64
INDIANA UNIV BLOOMINGTON DEPT OF CHEMISTRY
(AFOSR-65-1673)
AD-624 184 FLD. 7/4

•AF-AFOSR-672-64
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
UTIAS-TN-109
AD-623 867 FLD. 20/4

•AF-AFOSR-886-65
STANFORD UNIV CALIF DEPT OF GENETICS
IRL-1030
(AFOSR-65-1632)
F AD-624 074 FLD. 6/1

•AF-EOAR-8-65
PARMA UNIV (ITALY) INST OF HUMAN PHYSIOLOGY
IHP-65-1
(AFOSR-65-2216)
AD-623 800 FLD. 6/16

•AF-EOAR-15-64
INSTITUT NATIONAL DE LA SANTE ET DE LA RECHERCHE MEDICALE MARSEILLE (FRANCE) UNITE DE RECHERCHES NEUROBIOLOGI
(AFOSR-65-1686)
F AD-624 103 FLD. 6/5

•AF-EOAR-21-64
HEBREW UNIV JERUSALEM (ISRAEL) DEPT OF PSYCHOLOGY
SR-2
(AFOSR-65-1700)
AD-624 035 FLD. 5/10

•AF-EOAR-27-64
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHARMACOLOGY
(AFOSR-65-1529)
F AD-623 792 FLD. 6/16

•AF-EOAR-41-64
CLEVITE CORP BEDFORD OHIO
PIEZOELECTRIC DIV
(AFOSR-65-1579)
F AD-623 798 FLD. 6/5

•AF-EOAR-45-64
MAX-PLANCK-INSTITUT FUR BIOLOGIE TUBINGEN (GERMANY)
(AFOSR-65-1530)
F AD-623 805 FLD. 6/3

•AF-EOAR-47-64
LONDON UNIV (ENGLAND) INST OF LARYNGOLOGY AND OTOLOGY
(AFOSR-65-1603)
F AD-623 791 FLD. 6/3

•AF-EOAR-48-63
INSTITUT D'OPTIQUE PARIS (FRANCE)
(AFOSR-65-1677)
F AD-624 101 FLD. 11/6

•AF-EOAR-62-14
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHYSIOLOGY
(AFOSR-65-1541)
AD-624 007 FLD. 6/15
(AFOSR-65-1542)
AD-624 009 FLD. 6/16

•AF-EOAR-62-54
SHEFFIELD UNIV (ENGLAND) DEPT OF PHYSICS
(AFOSR-65-1597)
F AD-623 816 FLD. 20/3

•AF-EOAR-62-75
FREE UNIV BERLIN (GERMANY)
(AFOSR-65-1543)
AD-624 008 FLD. 6/16

•AF-EOAR-62-111
OXFORD UNIV (ENGLAND) DEPT OF HUMAN ANATOMY
(AFOSR-65-1546)
AD-624 013 FLD. 6/15

•AF-EOAR-63-12
LUND UNIV (SWEDEN) DEPT OF PHARMACOLOGY
(AFOSR-65-1547)
AD-624 010 FLD. 6/16

•AF-EOAR-64-58
BERGEN UNIV (NORWAY) PHYSIOLOGICAL INST
(AFOSR-65-1565)
F AD-623 919 FLD. 6/19

•AF-EOAR-68-64
MAX-PLANCK-INSTITUT FUER VERHALTENSPHYSIOLOGIE ERLING-ANDECHS (WEST GERMANY)
(AFOSR-65-1564)
F AD-623 809 FLD. 6/3

•AF-EOAR-74-63
BIRMINGHAM UNIV (ENGLAND) DEPT OF ELECTRON PHYSICS
(AFCRL-65-825)
F AD-623 899 FLD. 20/9

•AF-EOAR-89-63
NAPLES UNIV (ITALY) ISTITUTO DE FISICA TEORICA
(AFOSR-65-1488)
F AD-623 799 FLD. 6/16

•ARDS-553
AIRBORNE INSTRUMENTS LAB DEER PARK N Y
F AD-623 823 FLD. 17/7

•ARPA-ORDER-125-63
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
TR-30
AD-623 838 FLD. 7/4
65-9E3-113-P3
AD-623 839 FLD. 7/4

•ARPA ORDER-193-64
GEOLOGICAL SURVEY DENVER COLO
AD-624 001 FLD. 8/11

•ARPA ORDER-193-65
GEOLOGICAL SURVEY DENVER COLO
CRUSTAL STUDIES-40
AD-623 780 FLD. 8/11

•ARPA ORDER-279SEE
COLUMBIA UNIV NEW YORK
ELECTRONICS RESEARCH LABS
R-3/321
AD-624 132 FLD. 9/5

•ARPA ORDER-292
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS TERRESTRIAL SCIENCES LAB
INSTRUMENTATION PAPERS-81
(AFCRL-65-707)
AD-623 933 FLD. 8/7

•ARPA-ORDER-363
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS OPTICAL PHYSICS LAB
ERP-136
(AFCRL-65-674)
AD-623 876 FLD. 4/1

•ARPA-ORDER-529
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
PIBMRI-1295.1-65
AD-623 718 FLD. 20/9

•AT(30-1)-2179
WOODS HOLE OCEANOGRAPHIC INSTITUTION MASS
REF-65-53
AD-623 733 FLD. 8/10

•CPR-11-8686
CORNELL AERONAUTICAL LAB INC BUFFALO N Y
CAL-YM-1797-M-1
F AD-623 783 FLD. 5/10

•DA-11-022-ORD-2059
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
MRC-TSR-538

AD-623 739 FLD, 12/1
MRC-TSR-571
AD-623 740 FLD, 20/4
MRC-TSR-573
AD-623 741 FLD, 12/1
MRC-TSR-575
AD-623 742 FLD, 12/1
MRC-TSR-577
AD-623 743 FLD, 12/1
MRC-TSR-588
AD-623 744 FLD, 12/1
MRC-TSR-589
AD-623 745 FLD, 12/1
MRC-TSR-579
AD-623 746 FLD, 12/1
MRC-TSR-591
AD-623 747 FLD, 12/2
MRC-TSR-593
AD-623 748 FLD, 12/1
MRC-TSR-594
AD-623 749 FLD, 12/1
MRC-TSR-599
AD-623 750 FLD, 12/1
MRC-TSR-601
AD-623 751 FLD, 12/2
MRC-TSR-587
AD-623 764 FLD, 12/1
MRC-TSR-570
AD-623 765 FLD, 20/14
MRC-TSR-583
AD-623 766 FLD, 12/1
MRC-TSR-582
AD-623 767 FLD, 12/1

•DA-11-022-ORD-2059 GRANT
WISCONSIN UNIV MADISON
THEORETICAL CHEMISTRY INST
WIS-TCI-132
AD-624 128 FLD, 20/10

•DA-18-108-405-CML-1012
SOLID STATE RADIATIONS INC LOS ANGELES CALIF
F AD-623 722 FLD, 18/4

•DA-19-129-AMC-2(X)
TRONCHEMICS RESEARCH INC SOUTH HACKENSACK N J
F AD-623 712 FLD, 6/8

•DA-28-043-AMC-00091(E)
RABINOW ELECTRONICS INC ROCKVILLE MD
AD-624 020 FLD, 9/2

•DA-28-043-AMC-00168(E)
SPRAGUE ELECTRIC CO NORTH ADAMS MASS
3
AD-623 897 FLD, 9/1

•DA-28-043-AMC-00280(E)
LITTON PRECISION PRODUCTS INC
MORRIS PLAINS N J AIRTRON DIV
R11-482
AD-623 853 FLD, 9/5

•DA-28-043-AMC-00379(E)
ELECTRONIC DEFENSE LABS SYLVANIA ELECTRONIC SYSTEMS-WEST MOUNTAIN VIEW CALIF
EDL-M787
AD-624 098 FLD, 9/5

•DA-28-043-AMC-00438(E)
AIRBORNE INSTRUMENTS LAB DEER PARK N Y
AD-624 111 FLD, 9/1

•DA-28-043-AMC-00492(E)
GENERAL TELEPHONE AND ELECTRONICS LABS INC BAYSIDE N Y
TR-65-726.1
(ECOM-00492-1)
AD-624 055 FLD, 20/12

•DA28-043-AMC-00497(E)
AEROJET-GENERAL CORP DOWNEY CALIF
AGC-0937-01(01)AP
(ECOM-00497-1)
AD-623 714 FLD, 20/4

•DA-28-043-AMC-01230(E)
RADIO CORP OF AMERICA NEW YORK COMMUNICATIONS SYSTEMS DIV
CR-65-419-22
AD-623 851 FLD, 9/1

•DA-28-043-AMC-01325(E)
REEVES-HOFFMAN DIV DYNAMICS CORP OF AMERICA CARLISLE PA
AD-623 716 FLD, 9/1

•DA-28-043-AMC-01377(E)
TRAVELERS RESEARCH CENTER INC HARTFORD CONN
AD-623 836 FLD, 19/4

•DA-28-043-AMC-01395
MSI ELECTRONICS INC RICHMOND HILL N Y
AD-624 115 FLD, 9/1

•DA-28-043-AMC-01426(E)
GEORGIA INST OF TECH ATLANTA ENGINEERING EXPERIMENT STATION
A-868-1
(ECOM-01426-1)
AD-623 912 FLD, 9/3

•DA-31-124-ARO-D-308
MICHIGAN STATE UNIV EAST LANSING
DEPT OF CHEMISTRY
(AROD-5288-1)
AD-623 706 FLD, 7/4

•DA-31-124-ARO(D)-58
WASHINGTON UNIV ST LOUIS MO
(AROD-3076-10)
AD-624 031 FLD, 12/1

•DA-31-124-ARO(D)-103
CARLYLE BARTON LAB JOHNS HOPKINS UNIV BALTIMORE MD
REPRINT SERIES-13
AD-623 977 FLD, 20/6

•DA-31-124-ARO(D)-131
CARNEGIE INST OF TECH PITTSBURGH PA DEPT OF ELECTRICAL ENGINEERING
(AROD-3397-8)
AD-623 842 FLD, 20/12

•DA-31-124-ARO(D)-158
MISSOURI UNIV COLUMBIA
(AROD-4583-1)
F AD-623 907 FLD, 12/1

•DA-31-124-ARO(D)-190
CARNEGIE INST OF TECH PITTSBURGH PA DEPT OF METALLURGICAL ENGINEERING
(AROD-4838-2)
AD-624 032 FLD, 11/6

•DA-31-124-ARO(D)-277
NORTH CAROLINA STATE UNIV RALEIGH
(AROD-5010-4)
AD-624 033 FLD, 11/6

•DA-31-124-ARO(D)-318
RENSSELAER POLYTECHNIC INST TROY N Y
TR-AE-6504
(AROD-5641-1-1)
AD-624 147 FLD, 13/1

•DA-33-017-ENG-223
COURANT INST OF MATHEMATICAL SCIENCES NEW YORK UNIV N Y
IMM-NYU-200
AD-624 236 FLD, 8/8
IMM-NYU-205
AD-624 237 FLD, 8/8

•DA-33-017-ENG-267
COURANT INST OF MATHEMATICAL SCIENCES NEW YORK UNIV N Y
IMM-NYU-225
AD-624 238 FLD, 8/8

•DA-36-034-ORD-1646
PRINCETON UNIV N J OBSERVATORY
AD-624 180 FLD, 3/2

•DA-36-039-AMC-00070(E)
KORAD CORP SANTA MONICA CALIF
AD-624 164 FLD, 20/5

•DA-36-039-AMC-01471(E)
CLEVITE CORP BEDFORD OHIO
PIEZOELECTRIC DIV
AD-623 717 FLD, 9/1

•DA-36-039-AMC-01466(K)
SANTA BARBARA RESEARCH CENTER GOLETA CALIF
F AD-624 207 FLD, 17/5
F AD-624 208 FLD, 17/5

•DA-36-039-AMC-01471(E)
CLEVITE CORP BEDFORD OHIO
PIEZOELECTRIC DIV
AD-623 978 FLD, 9/1

•DA-36-039-AMC-01475(E)
MOTOROLA INC PHOENIX ARIZ
SEMICONDUCTOR PRODUCTS DIV
AD-624 153 FLD, 9/1

•DA-36-039-AMC-02251(E)
GEORGIA INST OF TECH ATLANTA ENGINEERING EXPERIMENT STATION
A-680-9
(ECOM-02251(E)-9)
AD-623 703 FLD, 9/1

•DA-36-039-AMC-02280(E)
THOMAS J WATSON RESEARCH CENTER YORKTOWN HEIGHTS N Y
AD-623 865 FLD, 20/1

•DA-36-039-AMC-02282(E)
BENDIX CORP DAVENPORT IOWA PIONEER-CENTRAL DIV
PUBLICATION-3392-65
AD-624 018 FLD, 9/1

•DA-36-039-AMC-02324(E)
TEXAS INSTRUMENTS INC DALLAS
SEMICONDUCTOR-COMPONENTS DIV
TI-03-65-71
AD-623 955 FLD, 9/5

•DA-36-039-AMC-03200(E)
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH CAMBRIDGE
AD-624 220 FLD, 9/3

•DA-36-039-AMC-03404(E)
ELECTRONIC DEFENSE LABS SYLVANIA ELECTRONIC SYSTEMS-WEST MOUNTAIN VIEW CALIF
EDL-M787
AD-624 098 FLD, 9/5

•DA-36-039-SC-89196
GENERAL ATOMIC SAN DIEGO CALIF
SPECIAL NUCLEAR EFFECTS LAB
GA-6529
F AD-623 904 FLD, 18/8

•DA-44-009-AMC-930(T)
HOLMAN (JOHN F) CO INC WASHINGTON D C
T-1810-65
(TT-65-64581)
AD-623 920 FLD, 20/6

•DA-44-177-AMC-212(T)
KAMAN AIRCRAFT CORP BLOOMFIELD CONN
KAMAN-R-555
(USAAVLABS-TR-65-52)
F AD-624 145 FLD, 1/3

•DA-44-188-ARO-2
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
TR-65-10
AD-624 048 FLD, 5/9

•DA-49-186-AMC-144(D)

UNITED AIRCRAFT CORP EAST HARTFORD
CONN RESEARCH LABS
AD-623 911 FLD, 13/7

•DA-49-193-MD-2238
MARYLAND UNIV COLLEGE PARK DEPT
OF ZOOLOGY
AD-624 159 FLD, 6/3
AD-624 160 FLD, 6/3

•DA-49-193-MD-2294
WASHINGTON UNIV SEATTLE
AD-624 037 FLD, 6/13

•DA-AMC-28-043-64-G9
COLORADO STATE UNIV FORT COLLINS
FLUID DYNAMICS AND DIFFUSION LAB
AD-623 900 FLD, 4/2
AD-623 901 FLD, 4/2
AD-623 902 FLD, 4/2
COLORADO STATE UNIV FORT COLLINS
FLUID MECHANICS PROGRAM
CER65GH-JEC49
AD-623 946 FLD, 20/4

•DA-ARO-49-092-64-G28
SOUTHERN ILLINOIS UNIV CARBONDALE
LAB OF APPLIED PHYSIOLOGY
TR-1
AD-623 808 FLD, 6/14

•DA-ARO-49-092-65-G78
INSTITUTO DE INVESTIGACION
AERONAUTICA Y ESPACIAL BUENOS
AIRES (ARGENTINA) LABORATORIO DE
RADIACIONES
LR-8
AD-624 028 FLD, 20/8

•DA-ARO(D)-31-124-G218
PENNSYLVANIA UNIV PHILADELPHIA
(AROD-3333:14)
AD-624 072 FLD, 12/1

•DA-ARO(D)-31-124-G223
NORTHWESTERN UNIV EVANSTON ILL
DEPT OF ELECTRICAL ENGINEERING
(AROD-3298:5)
AD-624 182 FLD, 12/1

•DA-ARO(D)-31-124-G250
RESEARCH TRIANGLE INST DURHAM N C
NATURAL PRODUCTS LAB
(AROD-3418:1)
AD-624 117 FLD, 8/1

•DA-ARO(D)-31-124-G369
NORTH CAROLINA UNIV CHAPEL HILL
DEPT OF CHEMISTRY
(AROD-3741:5)
AD-624 178 FLD, 7/2
(AROD-3741:4)
AD-624 179 FLD, 7/2

•DA-ARO(D)-31-124-G410
VIRGINIA POLYTECHNIC INST
BLACKSBURG
AD-623 726 FLD, 12/1

•DA-ARO(D)-31-124-G425
NEW YORK UNIV N Y DEPT OF
CHEMISTRY
(AROD-4019:7)
AD-624 183 FLD, 7/3

•DA-ARO(D)-31-124-G446
DELAWARE UNIV NEWARK DEPT OF
PHYSICS
(AROD-4169:3)
AD-624 189 FLD, 20/12

•DA-ARO(D)-31-124-G499
CALIFORNIA UNIV LOS ANGELES
(AROD-1517:70)
AD-624 114 FLD, 12/1
(AROD-1517:81)
AD-624 116 FLD, 12/1

•DA-ARO(D)-31-124-G500
OHIO STATE UNIV COLUMBUS DEPT OF
CHEMISTRY
(AROD-4486:2)
AD-624 073 FLD, 7/2

•DA-ARO(D)-31-124-G537
PENNSYLVANIA STATE UNIV UNIVERSITY
PARK IONOSPHERE RESEARCH LAB
(AROD-4515:2)
AD-624 071 FLD, 4/1

•DA-ARO(D)-31-124-G569
WASHINGTON UNIV ST LOUIS MO DEPT
OF PHYSICS
(AROD-2791:6)
AD-624 187 FLD, 20/8

•DA-ARO(D)-31-124-G570
CALIFORNIA UNIV LOS ANGELES
NUMERICAL ANALYSIS RESEARCH
(AROD-1210:114)
AD-624 186 FLD, 12/1

•DA-ARO(D)-31-124-G616
CHICAGO UNIV ILL DEPT OF
CHEMISTRY
(AROD-5107:1)
AD-624 113 FLD, 7/4

•DA-ARO(D)-31-124-G708
STATE UNIV OF NEW YORK BUFFALO
DEPT OF CHEMISTRY
(AROD-2650:8)
AD-624 185 FLD, 7/3

•DRB-5501-32
SASKATCHEWAN UNIV SASKATOON DEPT
OF ELECTRICAL ENGINEERING
AD-623 985 FLD, 9/1

•DRB-9512-20
EATON ELECTRONICS RESEARCH LAB
MCGILL UNIV MONTREAL (QUEBEC)
AD-623 987 FLD, 20/2

•FA64WA-5020
UNIVAC DIV SPERRY RAND CORP ST
PAUL MINN
PX-3539
(SRDS-RD-65-79)
AD-623 824 FLD, 17/7

•FA-WA-4459
AVIATION SAFETY ENGINEERING AND
RESEARCH PHOENIX ARIZ
AD-624 046 FLD, 1/3

•FA-WA-4569
AVIATION SAFETY ENGINEERING AND
RESEARCH PHOENIX ARIZ
F AD-624 051 FLD, 1/3

•GRANT PHS-MH-5283
SINAI HOSPITAL OF BALTIMORE MD
BIOCHEMISTRY RESEARCH DIV
AD-624 070 FLD, 6/1

•GRANT PHS-MH-00855
LOBUND LAB UNIV OF NOTRE DAME IND
AD-624 106 FLD, 6/5

•N-123(60520)52063A
HYDRAULIC RESEARCH AND MFG CO DIV
OF BELL AEROSPACE CORP BURBANK
CALIF
(NOTS-TP-3913:1)
AD-623 961 FLD, 9/5

•N140(131)-75607B(X)
AEROJET-GENERAL CORP AZUSA CALIF
3094 (FINAL)
F AD-623 947 FLD, 11/4

•N600(61533)61992
WESTINGHOUSE ELECTRIC CORP LIMA
OHIO AEROSPACE ELECTRICAL DIV
AD-624 216 FLD, 10/2

•N-61339-695
GPL DIV GENERAL PRECISION INC
PLEASANTVILLE N Y
(NTDC-695-1)
F AD-623 815 FLD, 17/2

•N62558-4085
WIGLEY (C) LONDON (ENGLAND)
AD-623 762 FLD, 13/10

•N62558-4347
HEBREW UNIV JERUSALEM (ISRAEL)
DEPT OF PHYSICS
AD-623 785 FLD, 20/12

•NAS8-5600
OCKHEED MISSILES AND SPACE CO
SUNNYVALE CALIF
AD-624 190 FLD, 20/11

•NBY-3186
MICHIGAN UNIV ANN ARBOR
F AD-624 107 FLD, 20/11

•NBY-24967
COLUMBIA UNIV NEW YORK DEPT OF
CIVIL ENGINEERING AND
ENGINEERING MECHANICS
TR-1
AD-624 060 FLD, 20/11

•NIH-AM-1236-07
PENNSYLVANIA UNIV PHILADELPHIA
DEPT OF PHYSIOLOGY
(AFOSR-65-1508)
AD-624 005 FLD, 6/16

•NIH-NB-1027
CEDARS-SINAI MEDICAL CENTER LOS
ANGELES CALIF CORNEA EYE INST
AD-623 982 FLD, 6/5
RETINA FOUNDATION BOSTON MASS
CORNEAL RESEARCH UNIT
AD-623 984 FLD, 6/5

•NIH-NB-03922-02AFO
NAPLES UNIV (ITALY) ISTITUTO DE
FISICA TEORICA
(AFOSR-65-1488)
F AD-623 799 FLD, 6/16

•NIH-NB-4281
CEDARS-SINAI MEDICAL CENTER LOS
ANGELES CALIF POLYMER DIV
AD-624 029 FLD, 6/16

•NIH-NB-04077
CEDARS-SINAI MEDICAL CENTER LOS
ANGELES CALIF POLYMER DIV
AD-623 981 FLD, 6/5
AD-623 983 FLD, 6/5

•NOBS-86483
WHIRLPOOL CORP ST JOSEPH MICH
RESEARCH AND ENGINEERING LABS
AD-623 730 FLD, 10/1

•NOBS-86538
GENERAL INSTRUMENT CORP NEWARK N J
THERMOELECTRIC DIV
F AD-623 763 FLD, 10/1

•NOBS-90187
CALIFORNIA UNIV BERKELEY INST OF
ENGINEERING RESEARCH
NA-65-3
AD-624 056 FLD, 13/10

•NOBS-92585
AUTONETICS ANAHEIM CALIF
CS-2121/32
F AD-624 167 FLD, 13/9

•NOBSR-89229
RADIOLOCATION RESEARCH LAB UNIV OF
ILLINOIS URBANA
RRL-291
AD-624 166 FLD, 17/3

•NOBSR-89288
NEW YORK UNIV N Y SCHOOL OF
ENGINEERING AND SCIENCE
SETE-210/67
AD-624 223 FLD, 9/3
SETE-210/71
AD-624 224 FLD, 9/5
SETE-210/79

AD-624 226 FLD, 9/3
SETE-210/83.1
AD-624 227 FLD, 5/9
SETE-210-84
AD-624 228 FLD, 14/2
SETE-210/85
AD-624 229 FLD, 14/2
SETE-228/3
AD-624 230 FLD, 6/18
SETE-228/7
AD-624 233 FLD, 14/2
SETE-210/88
AD-624 234 FLD, 9/3
SETE-213/81
AD-624 235 FLD, 9/3

•NOBSR-89519
LINDE DIV UNION CARBIDE CORP PARMA OHIO
AD-623 905 FLD, 9/1

•NOBSR-91299
GENERAL ELECTRIC CO AUBURN N Y SEMICONDUCTOR PRODUCTS DEPT
AD-623 903 FLD, 9/1

•NOM-72358
BOEING CO MORTON PA VERTOL DIV
D6-57117
AD-623 953 FLD, 1/5

•NOM-72358
BOEING CO MORTON PA VERTOL DIV
D6-57118
AD-623 952 FLD, 13/2

•NONR-220(24)
CALIFORNIA INST OF TECH PASADENA HYDRODYNAMICS LAB
E-79.8
AD-623 711 FLD, 13/10

•NONR-220(40)
CALIFORNIA INST OF TECH PASADENA
(AFOSR-65-1640)
AD-623 998 FLD, 20/4
CALIFORNIA INST OF TECH PASADENA DIV OF CHEMISTRY AND CHEMICAL ENGINEERING
(AFOSR-65-1638)
AD-623 996 FLD, 7/4

•NONR-220(54)
CALIFORNIA INST OF TECH PASADENA HYDRODYNAMICS LAB
E-138.1
AD-623 991 FLD, 20/4

•NONR-220(57)
CALIFORNIA INST OF TECH PASADENA DIV OF ENGINEERING AND APPLIED SCIENCE
TR-1
AD-623 917 FLD, 20/11

•NONR-225(50)
STANFORD UNIV CALIF INST FOR MATHEMATICAL STUDIES IN THE SOCIAL SCIENCES
TR-137
AD-623 884 FLD, 12/2
TR-138
AD-623 885 FLD, 5/3

•NONR-225(52)
STANFORD UNIV CALIF DEPT OF STATISTICS
TR-110
AD-623 862 FLD, 12/1

•NONR-225(67)
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
HEPL-69
AD-623 752 FLD, 20/7

•NONR-225(72)
STANFORD UNIV CALIF DEPT OF STATISTICS
TR-53
AD-623 863 FLD, 12/1

TR-62
AD-623 864 FLD, 12/1
TR-54
AD-623 954 FLD, 9/4

•NONR-233(39)
CALIFORNIA UNIV LOS ANGELES DEPT OF ZOOLOGY
AD-624 209 FLD, 6/2

•NONR-233(88)
CALIFORNIA UNIV LOS ANGELES DEPT OF PHYSICS
AD-624 068 FLD, 20/13

•NONR-233(95)
CALIFORNIA UNIV LOS ANGELES DEPT OF ZOOLOGY
AD-624 104 FLD, 6/13

•NONR-401(37)
CORNELL UNIV ITHACA N Y LAB OF ATOMIC AND SOLID STATE PHYSICS
TR-12
AD-623 909 FLD, 7/4

•NONR-447(39)
WASHINGTON UNIV SEATTLE DEPT OF MECHANICAL ENGINEERING
AD-624 168 FLD, 20/11

•NONR-477(24)
WASHINGTON UNIV SEATTLE DEPT OF ATMOSPHERIC SCIENCES
TR-19
AD-623 754 FLD, 8/12
TR-18
AD-623 755 FLD, 4/1

•NONR-477(40)
WASHINGTON UNIV SEATTLE COLL OF ENGINEERING
TR-1
AD-623 710 FLD, 11/6

•NONR-591(10)
RENSSELAER POLYTECHNIC INST TROY N Y DEPT OF CHEMISTRY
TR-27
AD-623 979 FLD, 10/2

•NONR-591(17)
RENSSELAER POLYTECHNIC INST TROY N Y CORROSION RESEARCH LAB
TR-3
AD-624 017 FLD, 11/6

•NONR-591(19)
RENSSELAER POLYTECHNIC INST TROY N Y DEPT OF CHEMISTRY
TR-9
AD-624 140 FLD, 11/9

•NONR-609(51)
YALE UNIV NEW HAVEN CONN
AD-624 109 FLD, 20/14

•NONR-760(14)
CARNEGIE INST OF TECH PITTSBURGH PA DEPT OF METALLURGICAL ENGINEERING
F AD-623 849 FLD, 11/6

•NONR-760(15)
CARNEGIE INST OF TECH PITTSBURGH PA
TR-18
AD-624 214 FLD, 7/4
TR-20
AD-624 215 FLD, 20/8

•NONR839(38)
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
PIBMRI-1295.1-65
AD-623 718 FLD, 20/9

•NONR-988(08)
FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS
FSU-STATISTICS-M80
(ONR-TR-16)
AD-623 829 FLD, 12/1
FSU-STATISTICS-M90
(ONR-TR-17)
AD-623 830 FLD, 12/2
FSU-STATISTICS-M91
(ONR-TR-18)
AD-623 831 FLD, 12/1

•NONR-988(13)
FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS
FSU-STATISTICS-M85
AD-623 833 FLD, 12/1
FSU-STATISTICS-M100
AD-623 834 FLD, 12/1

•NONR-988(13) GRANT
FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS
FSU-STATISTICS-M84
AD-623 832 FLD, 12/1

•NONR-1141(12)
SYSTEMS RESEARCH CENTER CASE INST OF TECH CLEVELAND OHIO
SRC-78-A-65-30
AD-623 723 FLD, 12/2

•NONR-1202(17)
WISCONSIN UNIV MADISON DEPT OF STATISTICS
TR-34
AD-624 026 FLD, 12/1
TR-36
AD-624 027 FLD, 12/1

•NONR-1224(15)
MICHIGAN UNIV ANN ARBOR DEPT OF PHYSICS
AD-623 735 FLD, 20/8

•NONR1286(10)
OREGON STATE UNIV CORVALLIS DEPT OF OCEANOGRAPHY
DATA-21 REF-65-20
AD-623 949 FLD, 8/10

•NONR-1286(10) GRANT
OREGON STATE UNIV CORVALLIS DEPT OF OCEANOGRAPHY
TR-49
AD-623 950 FLD, 8/10

•NONR-1358(03)
PRINCETON UNIV N J OBSERVATORY
AD-624 180 FLD, 3/2

•NONR-1398(05)
TEXAS UNIV GALVESTON CELL BIOLOGY UNIT
AD-624 105 FLD, 6/5

•NONR-1623(13)
LOBUND LAB UNIV OF NOTRE DAME IND
AD-624 106 FLD, 6/5

•NONR-1711(00) GRANT
DEARBORN OBSERVATORY NORTHWESTERN UNIV EVANSTON ILL
AD-624 063 FLD, 3/1

•NONR-1841(34) GRANT
MASSACHUSETTS INST OF TECH CAMBRIDGE
AD-623 886 FLD, 20/12

•NONR-1841(83)
MASSACHUSETTS INST OF TECH CAMBRIDGE
TR-2 140-65
AD-623 725 FLD, 5/1

•NONR-1858(03) GRANT
PRINCETON UNIV N J OBSERVATORY
AD-623 732 FLD, 3/2

•NONR-1858(33)
PRINCETON UNIV N J DEPT OF ASTRONOMY
F AD-623 915 FLD, 3/2

•NONR-1866(16)
CRUFT LAB HARVARD UNIV CAMBRIDGE MASS
TR-476
AD-623 778 FLD, 6/4

•NONR-1866(32)
CRUFT LAB HARVARD UNIV CAMBRIDGE MASS
TR-479
AD-623 779 FLD, 9/5

•NONR-1866(32)
CRUFT LAB HARVARD UNIV CAMBRIDGE MASS
TR-475
AD-624 154 FLD, 20/9

•NONR-1866(37)
HARVARD UNIV CAMBRIDGE MASS
AD-624 065 FLD, 12/1

•NONR-1866(37) GRANT
HARVARD UNIV CAMBRIDGE MASS
AD-624 064 FLD, 6/15

•NONR2119(04)
TEXAS A AND M UNIV COLLEGE STATION
DEPT OF OCEANOGRAPHY AND METEOROLOGY
REFERENCE-65-32T
AD-624 239 FLD, 8/3

•NONR-2196(00)
WOODS HOLE OCEANOGRAPHIC INSTITUTION MASS
REF-65-53
AD-623 733 FLD, 8/10

•NONR-2196(00) GRANT
WOODS HOLE OCEANOGRAPHIC INSTITUTION MASS
REF-65-54
AD-623 734 FLD, 8/5

•NONR-2216(13)
APPLIED OCEANOGRAPHY GROUP UNIV OF CALIFORNIA SAN DIEGO
AOG-U-621
AD-624 240 FLD, 8/10

•NONR-2216(23)
SCRIPPS INSTITUTION OF OCEANOGRAPHY UNIV OF CALIFORNIA LA JOLLA
AD-624 066 FLD, 8

•NONR-2279(00)
APPLIED PSYCHOLOGICAL SERVICES WAYNE PA
AD-624 061 FLD, 5/9

•NONR-2424(01)
SINAI HOSPITAL OF BALTIMORE MD BIOCHEMISTRY RESEARCH DIV
AD-624 070 FLD, 6/1

•NONR-2424(01) GRANT
SINAI HOSPITAL OF BALTIMORE MD BIOCHEMISTRY RESEARCH DIV
AD-624 069 FLD, 6/13

•NONR-2584(00)
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
TR-30
AD-623 838 FLD, 7/4
65-9E3-113-P3
AD-623 839 FLD, 7/4

•NONR-2804(00)
AEROJET-GENERAL CORP SACRAMENTO CALIF SOLID PROPELLANT RESEARCH OPERATIONS
(AFOSR-1622)
AD-623 860 FLD, 19/1

•NONR-3055(01)
COWLES FOUNDATION FOR RESEARCH IN ECONOMICS YALE UNIV NEW HAVEN CONN
COWLES FOUNDATION PAPER-231
AD-624 131 FLD, 12/2

•NONR-3157(00)
GENERAL DYNAMICS/CONVAIR SAN DIEGO CALIF
GD/C-DBE-65-025
A AD-623 980 FLD, 20/4

•NONR-3368(00)
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF
2-12-64-2
AD-623 837 FLD, 7/4

•NONR-3576(00)
WASHINGTON UNIV SEATTLE DEPT OF NEUROLOGICAL SURGERY
F AD-623 894 FLD, 6/5

•NONR-3591(01)
BUCKNELL UNIV LEWISBURG PA
TR-16
AD-624 052 FLD, 5/10

•NONR-3623(00)
VIRGINIA UNIV CHARLOTTESVILLE DEPT OF AEROSPACE ENGINEERING
AD-624 054 FLD, 7/4

•NONR-3634(01)
KANSAS STATE UNIV MANHATTAN DEPT OF PSYCHOLOGY
TR-33-36
AD-623 869 FLD, 5/10

•NONR-3656(18)
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH MATHEMATICS RESEARCH LAB
D1-82-0473
AD-624 021 FLD, 12/1

•NONR-3662(01) GRANT
CEDARS-SINAI MEDICAL CENTER LOS ANGELES CALIF CORNEA EYE INST
AD-623 982 FLD, 6/5
CEDARS-SINAI MEDICAL CENTER LOS ANGELES CALIF POLYMER DIV
AD-624 039 FLD, 6/16
RETINA FOUNDATION BOSTON MASS CORNEAL RESEARCH UNIT
AD-623 984 FLD, 6/5

•NONR-3767(00)(X)
UNITED STATES RUBBER CO WAYNE N J RESEARCH CENTER
AD-623 879 FLD, 11/5
AD-623 880 FLD, 11/5
AD-623 888 FLD, 11/5
AD-623 889 FLD, 11/5
AD-623 890 FLD, 11/5
AD-623 891 FLD, 11/5
AD-623 892 FLD, 11/5
AD-623 893 FLD, 11/5

•NONR-4073(00)
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
UTIAS-TN-80
AD-623 776 FLD, 20/7

•NONR-4076(00)
HONEYWELL RESEARCH CENTER HOPKINS MINN
HR-65-274
AD-623 887 FLD, 11/2

•NONR-4102(01)
LINCOLN LAB MASS INST OF TECH LEXINGTON
TR-377
(ESD-TDR-65-456)
AD-623 796 FLD, 9/2
TR-387
(ESD-TRD-65-68)
AD-624 110 FLD, 9/2

•NONR-4186(00)
OCEANICS INC PLAINVIEW N Y
OCEANICS-65-23
AD-624 155 FLD, 13/10

•NONR-4292(00)
PHILCO CORP WILLOW GROVE PA BIO-CYBERNETICS LAB
PHILCO-2386
F AD-623 951 FLD, 6/2

•NONR-4336(00)
DELAWARE UNIV NEWARK DEPT OF PHYSICS
TR-2
AD-623 895 FLD, 20/2

•NONR-4454(00)
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF
LMSC-4-28-64-1
AD-623 993 FLD, 8/14

•NONR-4568(00)
GM DEFENSE RESEARCH LABS SANTA BARBARA CALIF SEA OPERATIONS DEPT
TR-65-79
F AD-623 959 FLD, 13/10

•NONR-4725(00)
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
65-9E2-511-P1
AD-624 165 FLD, 20/9

•NONR-4800(00) GRANT
CEDARS-SINAI MEDICAL CENTER LOS ANGELES CALIF POLYMER DIV
AD-623 981 FLD, 6/5
AD-623 983 FLD, 6/5
TG-717
AD-623 973 FLD, 17/9

•NONR-63-0050-C
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF
2-60-64-39
AD-623 958 FLD, 20/11

•NONR-65-0329-D
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS
OSURF-1968-1
AD-624 191 FLD, 17/9

•NSF-G483
DEARBORN OBSERVATORY NORTHWESTERN UNIV EVANSTON ILL
AD-624 063 FLD, 3/1

•NSF-G-607
WASHINGTON UNIV SEATTLE
AD-624 206 FLD, 12/1

•NSF-G-2626
NOYES CHEMICAL LAB UNIV OF ILLINOIS URBANA
AD-624 171 FLD, 11/9

•NSF-GS464SEE
PRINCETON UNIV N J OBSERVATORY
AD-623 732 FLD, 3/2

•NSF-G-5906
NOYES CHEMICAL LAB UNIV OF ILLINOIS URBANA
AD-624 170 FLD, 11/9

•NSF-G6227
JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF CHEMISTRY
AD-624 210 FLD, 7/4

•NSF-G7066
FLORIDA UNIV GAINESVILLE
AD-624 193 FLD, 3/2

•NSF-G-12317
FLORIDA UNIV GAINESVILLE RADIO OBSERVATORY
(AROD-2083?)
AD-624 194 FLD, 3/2

•NSF-G22836
COLBY COLL WATERVILLE MAINE

AD-623 976 FLD, 5/10

•NSF-G-24043
CORNELL UNIV ITHACA N Y DEPT OF ZOOLOGY
(AAL-TR-64-36)
AD-624 043 FLD, 6/3

•NSF-G24908
MASSACHUSETTS INST OF TECH CAMBRIDGE
AD-623 886 FLD, 20/12

•NSF-GP-683
HARVARD UNIV CAMBRIDGE MASS
AD-624 064 FLD, 6/15

•NSF-GP-2567
CALIFORNIA UNIV LOS ANGELES
(AROD-1517:81)
AD-624 116 FLD, 12/1

•NSF-GP-2684
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
ERL-65-12
AD-624 075 FLD, 9/5

•NSF-GP-2761
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
PIBMRI-1215-64
(AFOSR-65-1726)
AD-624 080 FLD, 20/14

•NSF-GP-3548
OREGON STATE UNIV CORVALLIS DEPT OF OCEANOGRAPHY
TR-49
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•NSF-GP-3836
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629 232	14/2
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629 238	8/8
629 239	8/3
629 240	8/10
629 241	5/2
629 242	15/2

OTHER RESEARCH REPORTS AND RELATED MATERIAL

1. AERONAUTICS

AD-269 124 **Field 1C**
CFSTI Prices: HC$3.00
Space Recovery Systems, Inc., El Segundo, Calif.
DESIGN STUDY OF THE CAPSULE ESCAPE VEHICLE PARACHUTE RECOVERY SYSTEM HARDWARE,
by John A. Wells. Oct 61, 56p SRS-635
Contract AF33 (616)-7199,
Task 60780
ASD TR-61-178-Vol-1
Distribution: No limitation.

Descriptors: (*Jettisonable cockpits, Parachutes), (*Parachutes, Jettisonable cockpits), Catapults, Recovery, Ejection, Propulsion, Design, Effectiveness.

A detailed evaluation was conducted to determine the characteristics required in a parachute recovery system for an escape capsule ejected from an aircraft having a performance capability of Mach 4 and 100,000 feet altitude. Certain operational parameters such as maximum and minimum deployment velocity and altitude, final rate of descent, capsule weight, boost rocket thrust, etc., were given. Based on this evaluation, a general configuration of the system was established. An industry-wide survey of known sources of recovery system hardware components yielded data that were used in the design and evaluation of several basic types of systems. The most prominent of these were a gas-operated pyrotechnic system and an electric-pyrotechnic system. The gas-operated pyrotechnic system was selected ultimately as the optimum type available currently. A test program was established for qualification of the selected system. (Author)

AD-269 125 **Field 1C**
CFSTI Price: HC$4.00
Space Recovery Systems, Inc., El Segundo, Calif.
DESIGN STUDY OF THE CAPSULE ESCAPE VEHICLE PARACHUTE RECOVERY SYSTEM HARDWARE,
by John A. Wells. Oct 61, 108p SRS-635
Contract AF33 (616)-7199,
Task 60780
ASD TR-61-178-Vol-2
See also AD-269 124. Distribution: No limitation.

Descriptors: (*Escape systems (Aerospace), Design), (*Jettisonable cockpits, Parachutes), (*Parachutes, Recovery), Ejection, Pressure switches, Sequence switches, Time switches, Relays, Reels, Check valves, Explosive actuators, Effectiveness.

N65-24059 **Field 1B**
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration. Langley Station, Va. Langley Research Center.
WIND-TUNNEL STUDIES AT SUBSONIC AND TRANSONIC SPEEDS OF A MULTIPLE-MISSION VARIABLE-WING-SWEEP AIRPLANE CONFIGURATION,
by William J. Alford, Jr., Arvo A. Luoma, and William P. Henderson. Nov 1959, 74p
NASA TMX-206
Distribution: No limitation.

Descriptors: (*Aerodynamic characteristics, Airplane models), (*Airplane models, Aerodynamic characteristics).

N65-24060 **Field 1B**
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration. Edwards, Calif. Flight Research Center.
THEORETICAL STABILITY DERIVATIVES FOR THE X-15 RESEARCH AIRPLANE AT SUPERSONIC AND HYPERSONIC SPEEDS INCLUDING A COMPARISON WITH WIND-TUNNEL RESULTS.
by Harold J. Walker and Chester H. Wolowicz.
Aug 60, 116p
NASA TMX-287
Distribution: No limitation.

Descriptors: (*Research planes, Stability).

Identifiers: X-15 aircraft.

N65-25587 **Field 1E**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration. Langley Station, Va. Langley Research Center.
V/STOL CHARACTERISTICS IN RELATION TO TERMINAL REQUIREMENTS,
by Joseph W. Wetmore. 1965, 24p
NASA TMX-56535
Presented at Natl. Transport Eng. Conf. of the Am. Soc. of Civil Engr., Minneapolis, 19-20 May 1965. Distribution: No limitation.

Descriptors: (*Airports, Short take-off planes), (*Short take-off planes, Airports).

N65-26410 **Field 1A**
CFSTI Prices: HC$6.00 MF$1.25
Lockheed Missiles and Space Co., Sunnyvale, Calif.
FLOW FIELD PREDICTION AND ANALYSIS, PROJECT FIRE.
Final rept.,
by M. Vinokur, W. E. Nicolet, A. C. Buckingham, and H. Hoshizaki. Mar 65, 225p M-12-65-1
Contract NAS1 3417,
Proj. FIRE
NASA CR-63401
Distribution: No limitation.

Descriptors: (*Atmosphere entry, Analysis), (*Aerodynamic heating, Atmosphere entry).

Identifiers: Fire project.

N65-26633 **Field 1B**
CFSTI Prices: HC$4.00 MF$1.00
National Aeronautics and Space Administration. Langley Station, Va. Langley Research Center.
A WIND-TUNNEL INVESTIGATION OF THE CARRY LOADS AND MUTUAL INTERFERENCE EFFECTS OF 1/40 SCALE MODELS OF THE X-15 AND B-62 AIRPLANES IN COMBINATION,
by Robert T. Taylor and William J. Alford, Jr.
Dec 59, 135p
NASA TM-X-184
Distribution: No limitation.

Descriptors: (*Jet bombers, Aerodynamic characteristics), (*Rocket planes, Launching).

Identifiers: X-15 aircraft, B-52 aircraft.

N65-26635 **Field 1B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration. Langley Station, Va. Langley Research Center.
TRANSONIC AERODYNAMIC CHARACTERISTICS OF A VARIABLE-SWEEP AIRPLANE CONFIGURATION HAVING A 12-PERCENT-THICK WING AND AN INBOARD PIVOT LOCATION,
by Ralph P. Bielat and P. Kenneth Pierpont. Dec 60, 39p
NASA TMX-429
Distribution: No limitation.

Descriptors: (*Transonic planes, Transonic characteristics).

N65-26636 **Field 1B**
CFSTI Prices: HC$4.00 MF$0.75
National Aeronautics and Space Administration. Langley Station, Va. Langley Research Center.
SUBSONIC LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF A 1/30-SCALE CANARDAIRPLANE MODEL HAVING A WING WITH AN ASPECT RATIO OF 6.0,
by William B. Igoe, Francis J. Capone, and Richard J. Re. Jun 62, 113p
NASA TMX-668
Distribution: No limitation.

Descriptors: (*Airplane models, Canard configuration), (*Aerodynamic characteristics, Airplane models).

N65-26637 **Field 1B**
CFSTI Prices: HC$5.00 MF$1.00
National Aeronautics and Space Administration. Langley Station, Va. Langley Research Center.
LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF A 1/30-SCALE SUBSONIC CANARD-AIRPLANE MODEL HAVING A WING WITH AN ASPECT RATIO OF 3.6 AT MACH NUMBERS FROM 0.30 TO 0.98.
by William B. Igoe, Richard J. Re, and Francis J. Capone. Jun 62, 165p
NASA TMX-669
Distribution: No limitation.

Descriptors: (*Airplane models, Canard configuration), (*Aerodynamic characteristics), Airplane models).

N65-31100 **Field 1B**
CFSTI Prices: HC$3.00 MF$1.75
National Aeronautics and Space Administration. Washington, D. C. Scientific and Technical Information Div.
CONFERENCE ON AIRCRAFT OPERATING PROBLEMS.
1965, 335p
NASA SP-83
Conf. held at Langley Res. Center, Langley Station, Va., 10-12 May 1965. Distribution: No limitation.

Descriptors: (*Aeronautics, Reports), (*Symposia, Aeronautics), Civil aviation, Short take-off planes, Transport planes, Supersonic planes, Runways, Airplane noise.

N65-31571 **Field 1A**
CFSTI Prices: HC$3.00 MF$0.75
Toronto Univ., (Ontario).
INTEGRAL METHODS IN COMPRESSIBLE LAMINAR BOUNDARY LAYERS AND THEIR APPLICATION TO HYPERSONIC PRESSURE INTERACTIONS,
by Yat-Yung Chan. Sep 65, 99p
Grant NsG633
NASA CR-284
Distribution: No limitation.

Descriptors: (*Laminar boundary layer, Compressible flow), (*Hypersonic flow, Pressure).

N65-33352 **Field 1B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
A FLIGHT AND SIMULATOR STUDY OF THE HANDLING QUALITIES OF A DEFLECTED SLIPSTREAM STOL SEAPLANE HAVING FOUR PROPELLERS AND BOUNDARY-LAYER CONTROL,
by Curt A. Holzhauser, Robert C. Innis, and Richard F. Vomaske. Sep 65, 43p
NASA TND-2966
Distribution: No limitation.

Descriptors: (*Short take-off planes, Seaplanes), (*Seaplanes, Control systems).

N65-33355 Field 1A, 20M
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
ENTHALPY CALCULATED FROM PRESSURE AND FLOW-RATE MEASUREMENTS IN HIGH-TEMPERATURE SUBSONIC STREAMS,
by Ronald D. Brown and Bruce Fowler. Sep 65, 16p
NASA TND-3013
Distribution: No limitation.

Descriptors: (*Subsonic flow, Enthalpy), (*Enthalpy, Subsonic flow).

Patent 3,215,375 Field 1E
NYLON TAPE SLACK ELIMINATOR.
Patent assigned to Navy.
by John J. Radovitz. 2 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Arresting gear, Tapes), (*Tapes, Tension), Runways, Nylon, Patents.

The aircraft arresting gear has a pendant extending across a landing surface, an energy absorbing device, a tape secured to the pendant and a reel coupled with the energy absorber. The tape is wound on the reel for unwinding during arrestment. A tensioner is provided on the reel for tensioning the tape during winding.

SC-R-64-1311 Field 1A
CFSTI Prices: HC$8.96 MF$3.50
Sandia Corp., Albuquerque, N. Mex.
A COMPILATION OF LONGITUDINAL AERODYNAMIC CHARACTERISTICS INCLUDING PRESSURE INFORMATION FOR SHARP-AND BLUNT-NOSE CONES HAVING FLAT AND MODIFIED BASES,
comp. by A. D. Foster. Jan 65, 592p
Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Aerodynamic characteristics, Conical bodies), (*Conical bodies, Aerodynamic characteristics).

SC-TM-202-56-51 Field 1A, 14B
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
BASE AND SURFACE PRESSURE VARIATION WITH MACH NUMBER ON A RIGHT CIRCULAR CONE,
by James D. Iversen. 12 Sep 56, 16p
Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Conical bodies, Wind tunnel models).

2. AGRICULTURE

Patent 3,208,821 Field 2A, 7A, 7B
CALCIUM POLYPHOSPHATE FROM CONCENTRATED SUPERPHOSPHATE.
Patent assigned to TVA,
by James R. Lehr, John M. Potts and Larrabee D. Hand, Jr. 28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Fertilizers, Production), (*Calcium compounds, Phosphates), (*Phosphates, Production), Rock (Geology), Phosphoric acids, Heat treatment, Dehydration, Patents.

Identifiers: Calcium phosphates.

Concentrated superphosphate is treated to increase the plant-nutrient content of fertilizers. Calcium polyphosphate is produced from concentrated superphosphate. The process involves a heat treatment which results in the elimination of stickiness and ball formation during the process.

3. ASTRONOMY AND ASTROPHYSICS

BNL-9093 Field 3B, 20H
CFSTI Prices: HC$1.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.

SOLAR NEUTRINOS,
by Raymond Davis, Jr. and Don S. Harmer. 1964, 16p CONF-641214-2
Contract AT (30-2)-GEN-16
Presented at Texas Symposium on Relativistic Astrophysics, Austin, Tex. Distribution: No limitation.

Descriptors: (*Solar radiation, Neutrinos), (*Neutrinos, Solar radiation).

N65-17866 Field 3A, 22B
CFSTI Price: MF$1.25
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
RANGER VII PHOTOGRAPHS OF THE MOON. PART II. CAMERA 'B' SERIES.
Feb 65, 226p
NASA SP-62, Pt II
Hardcopy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $6.50.
Distribution: No limitation.

Descriptors: (*Moon, Photographs), (*Lunar probes, Photographic techniques).

Identifiers: Ranger spacecraft.

N65-19718 Field 3B, 20I
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
THE MAGNETOHYDRODYNAMIC WAKE OF THE MOON,
by Norman F. Ness. Oct 64, 61p Rept. no. TMX-55144
Microfilmed from best available copy. Distribution: No limitation.

Descriptors: (*Magnetohydrodynamics, Moon), (*Moon, Magnetohydrodynamics).

N65-19768 Field 3B, 20N, 17I
CFSTI Prices: HC$1.00 MF$0.50
Antenna Lab., Ohio State Univ., Research Foundation Columbus.
STUDIES OF THE RELATIONS BETWEEN THE RADAR SCATTERING PROPERTIES OF 'MOON-LIKE' SURFACES AND THEIR SURFACE FEATURES.
Semiannual summary rept. 1 May-31 Oct 64,
by Robert C. Taylor. 10 Feb 65, 4p
Grant NsG21361
NASA CR-57313
Distribution: No limitation.

Descriptors: (*Moon, Radar reflections), (*Radar reflections, Extraterrestrial topography).

N65-19961 Field 3A
CFSTI Prices: HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
THE RELATIONSHIP BETWEEN THE SYSTEM OF ASTRONOMICAL CONSTANTS AND THE RADAR DETERMINATIONS OF THE ASTRONOMICAL UNIT,
by Duane O. Muhleman. 22 May 63, 48p
NASA CR-51228
Distribution: No limitation.

Descriptors: (*Astronomy, Position finding), (*Radar equipment, Distance-measuring equipment).

N65-20971 Field 3B
CFSTI Prices: HC$3.00 MF$0.50
Maryland Univ., College Park, Dept. of Physics and Astronomy.
ON THE DEPOLARIZATION OF DISCRETE RADIO SOURCES BY FARADAY DISPERSION,
by B. J. Burn. Mar 65, 51p Rept. no. TR-440
Grant NsG5860
NASA CR-57777
Distribution: No limitation.

Descriptors: (*Extraterrestrial radio waves, Magnetooptic effect), (*Radio astronomy, Magneto-optic effect).

N65-24303 Field 3B
CFSTI Prices: HC$2.00 MF$0.50
Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
INWARD RADIAL DIFFUSION OF ELECTRONS E > 1.6 MeV IN THE OUTER RADIATION ZONE.
by L. A. Frank. Apr 65, 27p Rept. no. 65-13
Contract Nonr150906; Grant NsG233 62
NASA CR-62860
Microfilmed from best available copy. Distribution: No limitation.

Descriptors: (*Electron density, Space environmental conditions), (*Space environmental conditions, Electron density).

N65-24566 Field 3B, 22B
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
MEASUREMENT RELATIONSHIPS FOR PEGASUSTYPE METEOROID EXPERIMENTS,
by Charles C. Dalton. 5 May 65, 33p NASA-TMX-53255
Distribution: No limitation.

Descriptors: (*Meteors, Counting methods), (*Satellites (Artificial), Meteors).

N65-24717 Field 3B
CFSTI Prices: HC$3.00 MF$0.50
National Aeronautics and Space Administration, Cocoa Beach, Fla. John F. Kennedy Space Center.
ENGINEERING LUNAR MODEL OBSTACLES (ELMO),
by J. R. Olivier and R. E. Valentine. 8 Mar 65, 56p TR-145-D
NASA TMX-56451
Distribution: No limitation.

Descriptors: (*Lunar surface vehicles, Experimental design), (*Astronautics, Lunar surface vehicles).

N65-29294 Field 3B, 20M, 22A
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
RADIATION GEOMETRY FACTOR BETWEEN THE EARTH AND A SATELLITE,
by Tommy C. Bannister. Jul 65, 27p NASA-TN-D-2750
Distribution: No limitation.

Descriptors: (*Geometry, Thermal radiation), (*Space environmental conditions, Satellites (Artificial)), Earth, Albedo (Astronomy).

N65-31142 Field 3A, 22B
CFSTI Prices: HC$3.00 MF$0.50
National Aeronautics and Space Administration. Langley Station, Va. Langley Research Center.
THE EXPLORER XXIII MICROMETEROROID SATELLITE: DESCRIPTION AND PRELIMINARY RESULTS, NOVEMBER 6, 1964-FEBRUARY 15, 1965,
by Robert L. O'Neal. Aug 65, 58p
NASA TMX-1123
Distribution: No limitation.

Descriptors: (*Scientific satellites, Space probes), (*Meteors, Counting methods).
Identifiers: Explorer.

PB-168 648 Field 3F, 5C, 5K
CFSTI Prices: HC$7.85 MF$2.25
Massachusetts Inst. of Tech., Cambridge.
SURVEY OF TECHNOLOGY FOR HIGH SPEED GROUND TRANSPORT, PART I.
15 Jun 65, 484p
Contract C-85-65
Distribution: No limitation.

Descriptors: (*Transportation, Research program administration), (*Railroads, Research program administration), (*Roads, Research program administration), (*Civil engineering, Transportation), Urban planning, Urban areas, Economics, Sociology, Systems engineering, Feasibility studies.

Identifiers: Northeast corridor transportation project, High-speed passenger transportation, WashingtonBoston corridor.

This report presents the results of a research planning study initiated at M. I. T. on September 16, 1964 in support of the Northeast Corridor Transportation Project of the United States Department of Commerce. The objective of the Northeast Corridor Transportation Project is to determine the facilities that will be needed to transport passengers and freight in the region extending roughly from Boston, Massachusetts to Washington, D.C. in the era of 1980 and thereafter. This includes study of both technological and nontechnological aspects of transportation; analysis of transportation needs and related demographic and economic forecasts for the region; and consideration of the interaction between transportation services and their impact on the development of the region as a whole and of its many urban centers. It includes studies of both existing and projected facilities for all modes of intercity transport, prospective technological improvements in each mode and alternative network configurations.

4. ATMOSPHERIC SCIENCES

CONF-765-11 Field 4B
CFSTI Prices: HC$1.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Dept. of Meteorology.
SOME ASPECTS OF THE GENERAL CIRCULATION OF THE LOWER STRATOSPHERE,
by R. Newell and A. J. Miller. 1964, 18p
Contract AT (30-1)-765
Presented at Conference on Radioactive Fallout from Nuclear Weapons Tests (2nd), Germantown, Md., 3-6 Nov 1964. Distribution: No limitation.

Descriptors: (*Atmospheric motion, Stratosphere), (*Stratosphere, Atmospheric motion).

CU-2663-23 Field 4B, 8C
CFSTI Prices: HC$3.00 MF$0.50
Lamont Geological Observatory, Palisades, N. Y.

CIRCULATION NEAR THE SOUTHERN BERRY ISLANDS, BAHAMAS.
Technical rept.,
by Bernard Katz. Jul 65, 51p CU-23-65
Contract AT (30-1)-2663
Distribution: No limitation.

Descriptors: (*Ocean currents, Bahama Islands), (*Bahama Islands, Ocean currents).

LA-3328 Field 4A
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
BIBLIOGRAPHY OF ATMOSPHERIC OZONE TO 40 Km: ITS CONCENTRATION, DISTRIBUTION, METHODS OF DETECTION, AND RELATIONSHIP WITH OTHER METEOROLOGICAL PHENOMENA,
by Betty S. Jackson. 6 Apr 65, 34p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Ozone, Atmosphere), (*Atmospheric sounding, Ozone).

N65-17513 Field 4A, 8N
CFSTI Prices: HC$6.00 MF$1.25
Stanford Univ., Calif. Stanford Electronics Labs.
INTRODUCTION TO THE IONOSPHERE AND GEOMAGNETISM.
Technical rept. no. 8,
by O. K. Garriott and H. Rishbeth. Oct 64, 212p
SEL-64-111
Contract NSG3060
NASA CR-60862
Distribution: No limitation.

Descriptors: (*Ionosphere, Scientific research), (*Terrestrial magnetism, Scientific research).

N65-17692 Field 4A, 7D
CFSTI Prices: HC$2.00 MF$0.50
Rensselaer Polytechnic Inst., Troy, N. Y.
FUNDAMENTAL ATOM CHEMISTRY - APPLICATIONS TO CHEMISTRY OF THE UPPER ATMOSPHERE.
Final technical rept.,
by E. W. Albers, P. Harteck, and R. R. Reeves, Jr. 14 Dec 64, 39p
Contract NSG15861
NASA CR-60442
Distribution: No limitation.

Descriptors: (*Upper atmosphere, Chemical properties).

N65-19719 Field 4A, 4B, 20D
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
EVIDENCE FOR RAPID MOTION OF THE OUTER BOUNDARY OF THE MAGNETOSPHERE.
by Andrei Konradi and Richard L. Kaufmann. Oct 64, 24p Rept. no. TMX-55141
Microfilmed from best available copy. Distribution: No limitation.

Descriptors: (*Upper atmosphere, Boundary layer transition), (*Boundary layer transition, Upper atmosphere).

N65-26076 Field 4B
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. Marshall Space Flight Center.
SOME PRACTICAL ACCURACY CONSIDERATIONS OF SMOKE TRAIL WIND PROFILE DATA,
by Dennis W. Camp and James R. Scoggins. 14 May 65, 32p
NASA TMX-53261
Distribution: No limitation.

Descriptors: (*Wind, Flow visualization), (*Flow visualization, Wind).

N65-27386 Field 4A, 3B
CFSTI Prices: HC$4.00 MF$0.75
Iowa Univ., Iowa City. Dept. of Physics and astronomy.
TRAPPED PROTONS OF THE INNER RADIATION BELT.
Doctoral thesis,
by F. Walker Fillius. Jun 65, 106p
Contracts NAS5-1683, NASr-116
Distribution: No limitation.

Descriptors: (*Protons, Van Allen radiation belt), (*Van Allen radiation belt, Protons).

N65-30958 Field 4A, 20F
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
ATTEMPTS TO INCREASE THE HYDROXYL AIRGLOW ARTIFICIALLY BY RELEASE OF OZONE INTO THE UPPER ATMOSPHERE,
by A. E. Potter, Jr. and C. S. Stokes. Aug 65, 28p
NASA TND-2972
Distribution: No limitation.

Descriptors: (*Sky brightness, Simulation), (*Optical phenomena, Upper atmosphere), Ozone.

N65-33360 Field 4A
CFSTI Prices: HC$3.00 MF$0.75
GCA Corp., Bedford, Mass.
TURBULENT DIFFUSION OF SODIUM VAPOR TRAILS IN THE UPPER ATMOSPHERE,
by Owen Cote. Sep 65, 75p
Contract NASw 1083
NASA CR-301
Distribution: No limitation.

Descriptors: (*Sodium, Diffusion), (*Upper atmosphere, Wind).

PB-168 358 Field 4B
CFSTI Prices: HC$1.00 MF$0.50
National Hurricane Research Project, Weather Bureau, Washington, D. C.
OBJECTIVES AND BASIC DESIGN OF THE NATIONAL HURRICANE RESEARCH PROJECT,
by R. H. Simpson, N. E. LaSeur, R. C. Gentry, L. F. Hubert, and C. L. Jordan. Mar 56, 9p Rept. no. NHRP-1
Distribution: No limitation.

Descriptors: (*Tropical cyclones, Dynamics), (*Marine meteorology, Tropical cyclones), (*Hurricane tracking, Research program administration), (*Weather forecasting, Tropical cyclones), Storms, Meteorological parameters, Air mass analysis, Tropical regions.

The objectives are to (1) To investigate synoptic disturbances of the type that develop into hurricanes and to study the structure and behavior of these systems and their relation to large-scale flow features in an effort to discover the mechanisms of hurricane formation. (2) To examine the details of hurricane structure in order to understand the manner in which energy is released and transferred within the storm, and between the hurricane and its environment; and to determine the contribution to movement and (3) To study the formation of clouds and rain in hurricanes and to investigate possible thermodynamic imbalances which may permit modification of the structure and movement of hurricanes. (4) To determine important parameters in hurricane forecasting and to investigate how these can best be observed by the reconnaissance aircraft and by other means.

PB-168 359 Field 4B
CFSTI Prices: HC$2.00 MF$0.50
Weather Bureau, Washington, D. C. Office of Meteorological Research.
NUMERICAL WEATHER PREDICTION OF HURRICANE MOTION,
by Lester F. Hubert. Jul 56, 32p
NHRP 2
Distribution: No limitation.

Descriptors: (*Weather forecasting, Mathematical prediction), (*Hurricane tracking, Numerical methods; procedures), (*Tropical cyclones, Mathematical prediction), Meteorological charts, Mathematical models, Storms, Position finding, Marine meteorology.

PB-168 360 Field 4B
CFSTI Prices: HC$7.00 MF$1.50
Weather Bureau, Washington, D. C. Hydrometeorological Section.
RAINFALL ASSOCIATED WITH HURRICANES (AND OTHER TROPICAL DISTURBANCES),
by R. W. Schoner and S. Molansky. Jul 56, 313p

NHRP 3
Distribution: No limitation.

Descriptors: (*Rainfall, Tropical cyclones), (*Tropical cyclones, Rainfall), (*Marine meteorology, Tropical cyclones), Storms, Weather forecasting, Atmospheric precipitation, Hurricane tracking.

PB-168 361 **Field 4B**
CFSTI Prices: HC$3.00 MF$0.75
National Hurricane Research Project, Weather Bureau, Washington, D. C.
SURVEY OF METEOROLOGICAL FACTORS PERTINENT TO REDUCTION OF LOSS OF LIFE AND PROPERTY IN HURRICANE SITUATIONS.
Mar 57, 92p Rept. no. NHRP-5
Progress rept. of work accomplished under P. L. 71, 84th Congress, 1st session. Distribution: No limitation.

Descriptors: (*Tropical cyclones, Weather forecasting), (*Weather forecasting, Tropical cyclones), (*Civil defense systems, Tropical cyclones), Storms, Floods, Damage, Buildings, Casualties, Reduction, Hurricane tracking.

PB-168 362 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
National Hurricane Research Project, West Palm Beach, Fla.
A MEAN ATMOSPHERE FOR THE WEST INDIES AREA,
by C. L. Jordan. May 57, 20p Rept. no. NHRP-6
Distribution: No limitation.

Descriptors: (*Marine meteorology, West Indies), (*Atmospheric sounding, West Indies), Meteorological parameters, Climatology, Tropical regions, Tropical cyclones.

Mean aerological data for the West Indies area, based on 10-year records for three stations, are presented in tabular form. The mean data are compared with those previously presented and some of the interesting climatological features are discussed. (Author)

PB-168 364 **Field 4B**
CFSTI Prices: HC$2.00 MF$0.50
Weather Bureau, Washington, D. C. Extended Forecast Section.
SEASONAL VARIATIONS IN THE FREQUENCY OF NORTH ATLANTIC TROPICAL CYCLONES RELATED TO THE GENERAL CIRCULATION.
National Hurricane Research Project,
by Emanuel M. Ballenzweig. Jul 57, 36p
NHRP 9
Distribution: No limitation.

Descriptors: (*Tropical cyclones, Periodic variations), (*Marine meteorology, Tropical cyclones), (*Air mass analysis, Tropical cyclones), Weather forecasting, Atmospheric motion, Atlantic Ocean, Meteorological parameters, Hurricane tracking.

Tropical cyclone frequencies in the North Atlantic and along the coastal areas bordering on its western perimeter are related to mean patterns of the general circulation of the order of a season. In some hurricane seasons certain regions are relatively free of tropical cyclones while other areas become unusually vulnerable. The planetary waves vary in form and position from one hurricane season to another and it is demonstrated by means of composite charts that these varying circulation patterns form the framework for steering tropical cyclones after their generation and also play a role in determining their formation. Interrelationships between the tropical storm frequencies in the different geographical areas are discussed and the patterns favoring tropical cyclone penetration into the various areas compared. The significance of the results is presented and it is concluded that it may be possible to predict areas of greater or lesser vulnerability to tropical cyclones during a given circulation regime. (Author)

PB-168 365 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
National Hurricane Research Project, West Palm Beach, Fla.
ESTIMATING CENTRAL PRESSURE OF TROPICAL CYCLONES FROM AIRCRAFT DATA,
by C. L. Jordan. Aug 57, 15p Rept. no. NHRP-10
Distribution: No limitation.

Descriptors: (*Tropical cyclones, Barometric pressure), (*Marine meteorology, Tropical cyclones), Atmospheric sounding, Storms, Tropical regions, Air mass analysis, Radiosondes.

Dropsonde data for the eye of tropical cyclones are used for testing and deriving empirical relationships between the surface pressure and the heights of constant pressure surfaces. The derived regressions are used for the preparation of a nomogram which can be used for estimating surface pressure in the eye of tropical cyclones from airdraft data at any level up to 500 mb. The regressions also provide a basis for some comments on the mean thermal structure of the eye. (Author)

PB-168 366 **Field 4B**
CFSTI Prices: HC$3.00 MF$0.75
National Hurricane Research Project, West Palm Beach, Fla. Research Operations Base.
INSTRUMENTATION OF NATIONAL HURRICANE RESEARCH PROJECT AIRCRAFT,
by D. T. Hilleary and F. E. Christensen. Aug 57, 76p Rept. no. NHRP-11
Distribution: No limitation.

Descriptors: (*Hurricane tracking, Research aircraft), (*Research aircraft, Hurricane tracking), (*Tropical cyclones, Research aircraft), Marine meteorology, Airborne, Meteorological instruments, Calibration.

This paper describes the various instrumentation systems installed on the three aircraft assigned to the National Hurricane Researh Project. Explanations of the several systems and reasons for the different methods of recording are given. The paper also describes the calibration work performed to date; together with estimates of the reliability of the particular instruments, based upon the rather brief period of operation during 1956, or upon statements by the manufacturers.

PB-168 368 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
National Hurricane Research Project, West Palm Beach, Fla.
MEAN SOUNDINGS FOR THE HURRICANE EYE,
by C. L. Jordan. Sep 57, 13p Rept. no. NHRP-13
Distribution: No limitation.

Descriptors: (*Tropical cyclones, Atmospheric sounding), (*Atmospheric sounding, Tropical cyclones), (*Hurricane tracking, Atmospheric sounding), Storms, Marine meteorology, Air mass analysis, Radiosondes.

Identifiers: Hurricane Betsy (1956).

Mean soundings for the hurricane eye have been prepared for three arbitrarily defined storm intensities. The soundings, which extend to the 500-mb. level, are based on a sample of 39 dropsonde observations. Eye and 'rain area' soundings for hurricane Betsy or 1956 are compared with the mean soundings. (Author)

PB-168 369 **Field 4B**
CFSTI Prices: HC$2.00 MF$0.50
National Hurricane Research Project, Miami, Fla.
THE THREE-DIMENSIONAL WIND STRUCTURE AROUND A TROPICAL CYCLONE,
by Banner I. Miller. Jan 58, 44p Rept. no. NHRP-15
Available copy will not permit fully legible reproduction. Distribution: No limitation.

Descriptors: (*Tropical cyclones, Three-dimensional flow), (*Three-dimensional flow, Tropical cyclones), (*Hurricane tracking, Air mass analysis), Marine meteorology, Wind, Configuration.

Wind data from a number of hurricanes are combined to obtain a composite picture of the hurricane circulation. Several layers from the surface to 16 km. are investigated. Divergence, vertical motion, and vorticity are computed from the mean data for the various layers. The results are discussed in relation to current models of the hurricane circulation. (Author)

PB-168 373 **Field 4B**
CFSTI Prices: HC$2.00 MF$0.50
National Hurricane Research Project, Miami, Fla.
THE USE OF MEAN LAYER WINDS AS A HURRICANE STEERING MECHANISM,
by Banner I. Miller. Jun 58, 27p Rept. no. NHRP-18
Distribution: No limitation.

Descriptors: (*Tropical cyclones, Air mass analysis), (*Air mass analysis, Tropical cyclones), (*Hurricane tracking, Air mass analysis), Wind, Marine meteorology.

The mean wind around a tropical cyclone is determined for several layers of various thicknesses extending from the surface to 16 km. This is done by combining wind observations from a large number of storms in order to obtain a composite picture of the hurricane circulation. The resultant wind for each layer is calculated over a ring extending 2-6 degrees latitude from the center of the hurricane. This resultant is compared with the mean motion of the storm in an effort to establish the layer whose mean flow corresponds most closely to the motion of the hurricane. The data indicate that for moderate to intense storms the best steering layer is the 500 to 200-mb. layer. Finally an effort is made to develop a constant pressure chart which will represent the mean flow for a deep layer. This is done by averaging the standard constant pressure heights for the bottom, the middle, and the top of the layer. The geostrophic components are calculated from the mean chart and these components are compared with the actual mean wind for the layer. It is concluded that the standard constant pressure chart at the middle of the layer affords as good an approximation of the mean wind for the layer as does the mean chart. (Author)

PB-168 378 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
National Hurricane Research Project, West Palm Beach, Fla.
DETAILS OF CIRCULATION IN THE HIGH ENERGY CORE OF HURRICANE CARRIE.
Nov 58, 18p Rept. no. NHRP-24
Distribution: No limitation.

Descriptors: (*Tropical cyclones, Thermodynamics), (*Marine meteorology, Tropical cyclones), (*Hurricane tracking, Air mass analysis), Storms, Kinetic energy, Wind, Atmospheric sounding, Research aircraft.

Identifiers: Hurricane Carrie (1957).

PB-168 381 **Field 4B**
CFSTI Prices: HC$2.00 MF$0.50
National Hurricane Research Project, Weather Bureau, Washington, D. C.
PROCEEDINGS OF THE BOARD OF REVIEW AND CONFERENCE ON RESEARCH PROGRESS,
Mar 59, 29p Rept. no. NHRP-27
Prepared for presentation to Session of Technical Conference on Hurricanes, sponsored by American Meteorological Society (final), Miami Beach, 22 Nov 1958. Distribution: No limitation.

Descriptors: (*Tropical cyclones, Symposia), (*Hurricane tracking, Research program administration), (*Marine meteorology, Tropical cyclones), Weather forecasting, Storms.

The objectives of the conference were to review and evaluate progress of research on the hurricane problem in recent years, and to point the course toward which future research can be most profitably directed. Participation was specifically invited of all agencies and institutions known to be engaged in or directly concerned with research on tropical cyclones, and invitations were also sent to weather services of other countries.

PB-168 384 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
Florida State Univ., Tallahassee. Dept. of Meteorology.
MEAN SOUNDINGS FOR THE GULF OF MEXICO AREA,
by Paul J. Hebert and C. L. Jordan. Apr 59, 13p
NHRP 30
Available copy will not permit fully legible reproduction. Distribution: No limitation.

Descriptors: (*Marine meteorology, Mexico Gulf), (*Mexico Gulf, Marine meteorology), (*Atmospheric sounding, Mexico Gulf), Climatology, Meteorological parameters, Tropical cyclones.

Mean aerological data for the Gulf of Mexico area have been prepared from 10-year records for three stations. Mean monthly height, temperature, and relative humidity data are tabulated for constant pressure surfaces. More detailed information, including density, potential temperature, and specific humidity, is shown for the mean 'hurricane season' sounding. The mean data are compared with those previously presented for the West Indies area and some of the interesting climatological features are discussed. (Author)

PB-168 385 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
Weather Bureau, Washington, D. C. Hydrometeorological Section.
FILLING AND INTENSITY CHANGES IN HURRICANES OVER LAND,
by William Malkin. Nov 59, 21p
NHRP 34
Written as part of work under P. L. 71, 84th Congress under funds transferred from the Corps of Engineers. Distribution: No limitation.

Descriptors: (*Tropical cyclones, Air mass analysis), (*Air mass analysis, Tropical cyclones), Weather forecasting, Hurricane tracking, Marine meteorology.

The change in central pressure after landfall of 13 selected hurricanes is analyzed. A formula that fits the average filling curve is given. The average change in pressure gradient after landfall is also evaluated. One of several incidental findings pertains to the consistent values obtained when applying an objective definition for the pressure at the periphery of a hurricane. (Author)

PB-168 387 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
Florida State Univ., Tallahassee. Dept. of Meteorology.
CLIMATOLOGICAL ASPECTS OF THE INTENSITY OF TYPHOONS,
by Niel L. Frank and C. L. Jordan. Feb 60, 20p
NHRP 36
Distribution: No limitation.

Descriptors: (*Tropical cyclones, Climatology), (*Climatology, Tropical cyclones), (*Marine meteorology, Pacific Ocean), Storms, Intensity, Pacific Ocean, Meteorological parameters.

Identifiers: Typhoons.

Some aspects of the intensity of typhoons have been investigated by utilizing central pressure data observed during the period 1950-1957. Interannual seasonal changes in the frequency of storms of different intensities are examined and compared with statistics relating to typhoons of all intensities covering a much longer period. Geographical aspects of typhoon formation and intensity have been investigated by plotting the formation points and the points of minimum pressure of individual typhoons and by preparing maps depicting the frequency of typhoons of different intensities. (Author)

PB-168 390 **Field 4B**
CFSTI Prices: HC$3.00 MF$0.75
National Hurricane Research Project, Miami, Fla.
ON THE HEAT BALANCE OF THE TROPOSPHERE AND WATER-BODY OF THE CARIBBEAN SEA,
by Jose A. Colon. Dec 60, 65p Rept. no.
NHRP-41
Distribution: No limitation.

Descriptors: (*Marine meteorology, Caribbean Sea), (*Caribbean Sea, Marine meteorology), Troposphere, Seas, Heat flux, Meteorological parameters, Kinetic energy, Climatology.

PB-168 391 **Field 4B**
CFSTI Prices: HC$3.00 MF$0.75
Weather Bureau, Washington, D. C. Office of Climatology.
CLIMATOLOGY OF 24-HOUR NORTH ATLANTIC TROPICAL CYCLONE MOVEMENTS,
by George W. Cry. Jan 61, 96p
NHRP 42
Distribution: No limitation.

Descriptors: (*Tropical cyclones, Climatology), (*Climatology, Tropical cyclones), (*Marine meteorology, Tropical cyclones), Air mass analysis, Weather forecasting.

Tropical cyclone movements are an important aspect of hurricane forecasts and warnings. Summaries of 24-hour changes of tropical cyclone (hurricane and tropical storm) center positions in delta latitude-delta longitude groupings for 68 selected areas of the North Atlantic region during the period 1886-1958 are presented. The month and year of tropical cyclone origin or detection and the total frequency of individual tropical cyclone passages through each area are included. Points of recurvature, portions of tropical cyclone tracks containing complete loops, and tables of mean speeds in various latitudes are also shown. (Author)

PB-168 410 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
Meteorological Research Inst., Tokyo (Japan).
STUDIES ON STATISTICAL PREDICTION OF TYPHOONS,
by H. Arakawa. Apr 63, 19p
NHRP 61
Available copy will not permit fully legible reproduction. Distribution: No limitation.

Descriptors: (*Tropical cyclones, Mathematical prediction), (*Weather forecasting, Tropical cyclones), (*Marine meteorology, Tropical cyclones), Pacific Ocean, Storms, Meteorological parameters, Statistical analysis.

Identifiers: Typhoons.

Forecasting the tracks and the intensities of typhoons is a very important problem in Japan, for the estimated annual mean damage amounted to some 2/3 billion dollars in the 1946-1958 census. Although synoptic forecasters can predict the movement of typhoons with moderate skill, there exists a need for more accurate forecasts. Recent advances in numerical weather prediction provide unique forecasting techniques that seem to be very promising. Another promising alternative is the statistical method of forecasting the movement of hurricanes proposed by Veigas and Miller (Probabilistic Prediction of Hurricane Movement by Synoptic Climatology, No. 2 Travelers Weather Research Center). This paper summarizes a statistical study of the movements and the central surface pressures of typhoons by means of the Veigas-Miller screening procedure. (Author)

PB-168 552 **Field 4B**
CFSTI Prices: HC$7.00 MF$1.75
Weather Bureau, Washington, D. C. Sea-Air Interaction Lab.
PROCEEDINGS OF THE SEA-AIR INTERACTION CONFERENCE, TALLAHASSEE, FLORIDA FEBRUARY 23-25, 1965.
Technical note,
20 Aug 65, 337p TN-9-SAIL-1
Prepared in cooperation with Florida State Univ., Tallahassee. Dept. of Meteorology. Available copy will not permit fully legible reproduction. Distribution: No limitation.

Descriptors: (*Marine meteorology, Symposia), Atmosphere, Oceans, Sea water, Boundary layer transition, Thermodynamics, Storms, Marine geophysics, Oceanology.

Contents: Air sea exchange as a factor in synopticscale meteorology in middle latitudes; The threedimensional ocean circulation driven by density gradients in an enclosed basin; On the present state of knowledge in air-sea boundary layer problems; A survey of the role of sea-air interaction in tropical meteorology; Sensible and latent heat exchange in low latitude synoptic-scale systems; Intensity of hurricanes in relation to sea surface energy exchange; The Gulf of Mexico after HILDA (Preliminary Results); Evidence of surface cooling due to typhoons; The modification of water temperature by hurricane CARLA; On the low level thermal stratification of the monsoon air over the Arabian Sea and its connection to the water temperature field; A low-level jet produced by air, sea, and land interactions; U. S. Fleet numerical weather facility activities relating to sea-air interactions on a synoptic scale; Synoptic scale heat exchange and its relations to weather; Laboratory studies of wind action on water standing in a channel; On the instability of ekman boundary flow; Federal research programs in air-sea interaction.

PB-168 632 **Field 4B, 4A**
CFSTI Prices: HC$2.00 MF$0.50
Weather Bureau, Washington, D. C.
WEATHER AND CLIMATE MODIFICATION.
Rept. to the Chief,
by Donald L. Gilman, James R. Hibbs, and Paul L.Laskin. 10 Jul 65, 46p
Distribution: No limitation.

Descriptors: (*Artificial precipitation, Research program administration), (*Meteorology, Artificial precipitation), (*Climatology, Artificial precipitation), Economics, Sociology, Law.

This report concentrates mainly on the problem of designing a rationally balanced research and development program for weather and climate modification. Some important legal and legislative questions are also discussed.

5. BEHAVIORAL AND SOCIAL SCIENCES

AD-286 795 **Field 5D**
CFSTI Price: HC$4.00
RAND Corp., Santa Monica, Calif.
TECHNICAL AND POLITICAL ASPECTS OF ARMS CONTROL NEGOTIATION: THE 1958 EXPERTS' CONFERENCE.
Memorandum rept.,
by Ciro Elliott Zoppo. Sep 62, 114p Memo. no.
RM-3286-ARPA
Contract SD79,
ARPA Order189
Distribution: No limitation.

Descriptors: (*Arms control, Political science), Deterrence, Disarmament, Cold

war, USSR, United States Government, Nuclear weapons, Nuclear explosions, Detection, Seismology, Acoustic detectors, Underground explosions, Electromagnetic waves, Scientific personnel, Foreign policy, Symposia.

N65-17052 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Walter Reed Army Inst. of Research, Washington, D. C.
TIMING BEHAVIOR AND STIMULUS GENERALIZATION,
by J. V. Brady and B. Migler. 1963, 5p
Contract NSG189 61
NASA CR-53693
Distribution: No limitation.

Descriptors: (*Behavior, Training).

N65-25002 **Field 5H**
CFSTI Prices: HC$1.00 MF$0.50
Case Inst. of Tech., Cleveland, Ohio.
INVESTIGATION OF CONTROL IN MAN-MACHINE SYSTEMS WITH EMPHASIS ON PROBLEMS OF REMOTE MANIPULATION.
Progress rept, 1 Aug 64-31 Jan 65, 14 May 65, 21p
Grant NsG728
NASA CR-62878
Paper presented at Ann. Symp. of the Profess. Group on Human Factors in Electron (6th). The Inst. of Elec. and Electron. Engr., 6-8 May 1965.
Distribution: No limitation.

Descriptors: (*Man-machine systems, Remote control systems).

PB-168 493 **Field 5B, 9B, 5G**
CFSTI Prices: HC$3.00 MF$0.75
National Science Foundation, Washington, D. C. Office of Science Information Service.
CURRENT RESEARCH AND DEVELOPMENT IN SCIENTIFIC DOCUMENTATION NO 4.
Apr 59, 85p NSF-59-28
See also PB-163 935. Distribution: No limitation.

Descriptors: (*Documentation, Scientific research), Scientific personnel, Information retrieval, Classification, Subject indexing, Machine translation, Computers, Data processing systems, Data storage systems, Data transmission systems, Reading machines, Language, Artificial intelligence.

Identifiers: Linguistics, Computational linguistics, Coding (Documentation).

All pertinent activities in the United States that have come to the attention of the Foundation staff are included, as well as foreign projects upon which information could be obtained. The descriptive statements are classified under the five subject headings listed below. (1) Information Requirements and Uses--for studies and analyses of information needs of scientists and their use of information. (2) Research on Information Storage and Retrieval--for studies of methods and systems of analysis, ordered arrangement, encoding and searching of subject matter, and for theoretical studies of information storage and retrieval. (3) Mechanical Translation--for work on procedures for automatic translation from one natural language to another. (4) Equipment Development--for development of devices for processing information, including reading, storing, searching, transmitting, and translating devices. (5) Miscellaneous--for research and development that cannot be classified under any of the first four headings.

PB-168 494 **Field 5B, 9B, 5G**
CFSTI Prices: HC$4.00 MF$0.75
National Science Foundation, Washington, D. C. Office of Science Information Service.
CURRENT RESEARCH AND DEVELOPMENT IN SCIENTIFIC DOCUMENTATION NO. 5.
Oct 59, 101p NSF-59-54
See also PB-168 493. Distribution: No limitation.

Descriptors: (*Documentation, Scientific research), Scientific personnel, Information retrieval, Classification, Subject indexing, Machine translation, Computers, Data processing systems, Data storage systems, Data transmission systems, Reading machines, Language, Artificial intelligence.

Identifiers: Linguistics, Computational linguistics, Coding (Documentation).

PB-168 495 **Field 5B, 9B, 5G, 6D**
CFSTI Prices: HC$4.00 MF$1.00
National Science Foundation, Washington, D. C. Office of Science Information Service.
CURRENT RESEARCH AND DEVELOPMENT IN SCIENTIFIC DOCUMENTATION NO. 6.
May 60, 131p NSF-60-25
See also PB-168 494. Distribution: No limitation.

Descriptors: (*Documentation, Scientific research), (*Scientific personnel, Information retrieval, Classification, Subject indexing, Machine translation, Computers, Data processing systems, Data storage systems, Data transmission systems, Reading machines, Language, Artificial intelligence, Programming (Computers), Pattern recognition, Speech recognition, Indexes, Printing, Character recognition.

Identifiers: Linguistics, Computational linguistics, Coding (Documentation).

The statements are grouped under the five headings listed below. (1) Information Requirements and Uses studies and analyses of the information needs of scientists, of the uses made of scientific and technical information, and of communication problems in science and technology, including publication studies and experiments with new indexing tools, publishing formats, and techniques. (2) Information Storage and Retrieval - studies of methods and systems of analysis, ordered arrangement, encoding, and searching of subject matter, including theoretical studies of information storage and retrieval. (3) Mechanical Translation - research on problems of automatic translation from one natural language to another. (4) Equipment development of devices for the processing of scientific information including devices for reading, storing, searching, transmitting, and translating. (5) Potentially Related Research - work on problems not immediately connected with scientific documentation but whole solution is most likely to have an impact on the future of documentation, including such fields as automatic programming, pattern and speech recognition, linguistic analysis, artificial intelligence.

PB-168 496 **Field 5B, 9B, 5G, 6D**
CFSTI Prices: HC$5.00 MF$1.00
National Science Foundation, Washington, D. C. Office of Science Information Service.
CURRENT RESEARCH AND DEVELOPMENT IN SCIENTIFIC DOCUMENTATION NO. 7.
Nov 60, 156p NSF-60-65
See also PB-168 495. Distribution: No limitation.

Descriptors: (*Documentation, Scientific research), Scientific personnel, Information retrieval, Classification, Subject indexing, Machine translation, Computers, Data processing systems, Data storage systems, Data transmission systems, Reading machines, Language, Artificial intelligence, Programming (Computers), Pattern recognition, Speech recognition, Indexes, Printing, Character recognition.

Identifiers: Linguistics, Computational linguistics, Coding (Documentation).

PB-168 497 **Field 5B, 9B, 5G, 6D**
CFSTI Prices: HC$5.00 MF$1.25
National Science Foundation, Washington, D. C. Office of Science Information Service.
CURRENT RESEARCH AND DEVELOPMENT IN SCIENTIFIC DOCUMENTATION NO. 8.
May 61, 194p NSF-61-29
See also PB-168 496. Distribution: No limitation.

Descriptors: (*Documentation, Scientific research), Scientific personnel, Information retrieval, Classification, Subject indexing, Machine translation, Computers, Data processing systems, Data storage systems, Data transmission systems, Reading machines, Language, Artificial intelligence, Programming (Computers), Pattern recognition, Speech recognition, Indexes, Printing, Character recognition, Psychology.

PB-168 498 **Field 5B, 9B, 5G, 6D**
CFSTI Prices: HC$6.00 MF$1.50
National Science Foundation, Washington, D. C. Office of Science Information Service.
CURRENT RESEARCH AND DEVELOPMENT IN SCIENTIFIC DOCUMENTATION NO. 9.
Nov 61, 275p NSF-61-76
See also PB-168 497. Distribution: No limitation.

Descriptors: (*Documentation, Scientific research), Scientific personnel, Information retrieval, Classification, Subject indexing, Machine translation, Computers, Data processing systems, Data storage systems, Data transmission systems, Reading machines, Language, Artificial intelligence, Programming (Computers), Pattern recognition, Speech recognition, Indexes, Printing, Character recognition, Psychology.

PB-168 545 **Field 5B, 9B**
CFSTI Prices: HC$2.00 MF$0.50
National Science Foundation, Washington, D. C. Office of Science Information Service.
NONCONVENTIONAL TECHNICAL INFORMATION SYSTEMS IN CURRENT USE NO. 2, SUPPLEMENT.
Mar 60, 47p
NSF 60-14
See also PB-168 547. Distribution: No limitation.

Descriptors: (*Documentation, History), Information retrieval, Subject indexing, Automation, Automatic, Computers, Punched cards, Reports, Data, Indexes, Bibliographies, Data processing systems, Data storage systems.

PB-168 547 **Field 5B, 9B**
CFSTI Prices: HC$3.00 MF$0.75
National Science Foundation, Washington, D. C. Office of Science Information Service.
NONCONVENTIONAL TECHNICAL INFORMATION SYSTEMS IN CURRENT USE NO. 2.
Sep 59, 70p
NSF 59-49
See also PB-168 544. Distribution: No limitation.

Descriptors: (*Documentation, History), Information retrieval, Subject indexing, Automation, Automatic, Computers, Punched cards, Reports, Data, Indexes, Bibliographies, Data processing systems, Data storage systems.

Identifiers: Coding (Documentation), Information systems.

The report consists of descriptions of technical information systems currently in operation which embody new principles for the organization of subject matter or employ automatic equipment for storage and search. These reports are prepared as a service to individuals and organizations interested in scientific documentation. The descriptions are arranged alphabetically by organizations, within three broad categories: Section I-SYSTEMS THAT STORE REFERENCES. In these systems, subject entries and bibliographic clues to documents are stored; searches result in identifcation of pertinent documents such as published or unpublished reports, articles, patents, memoranda, etc. Section II-SYSTEMS THAT STORE

DATA. In these systems, information and facts themselves are stores; searches result in tabulations of the data or reports that summarize the data. Section III SYSTEMS USED TO PREPARE INDEXES. These systems store references or data but are not used for regular search or retrieval. They have been developed and are being used to prepare indexes or bibliographies, which can then be used for searching for references or data.

PB-168 549 **Field 5B, 9B**
CFSTI Prices: HC$6.00 MF$1.25
National Science Foundation, Washington, D. C.
NONCONVENTIONAL TECHNICAL INFORMATION SYSTEMS IN CURRENT USE NO. 3.
Oct 62, 224p NSF-62-34
See also PB-168 545 and -168 547. Distribution: No limitation.

Descriptors: (*Documentation, History), Information retrieval, Subject indexing, Automation, Automatic, Computers, Punched cards, Reports, Data, Indexes, Bibliographies, Data processing systems, Data storage systems.

The report contains descriptions of 87 nonconventional systems from 73 different organizations. Sixty-five of these organizations reported on only one system, six reported two each, one reported three, and one reported seven. Of the 73 organizations, approximately one-half are new to this series, having not been reported in 'Nonconventional Technical Information Systems in Current Use, No. 2.' The report includes updated information on three systems outside the United States. (Author)

PB-168 571 **Field 5H, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Bolt, Beranek and Newman, Inc., Cambridge, Mass.
ON-LINE MAN-COMPUTER COMMUNICATION,
by J. C. R. Licklider and Welden E. Clark. 1962, 16p
Presented at Spring Joint Computer Conference, 1962, San Francisco, Calif., p113-28. Available copy will not permit fully legible reproduction. Document contains halftone illustrations which are difficult to read in reprints. Distribution: No limitation.

Descriptors: (*Man-machine systems, Scientific research), (*Computers, Man-machine systems), Learning, Teaching methods, Computer logic, Programming (Computers), Hospitals.

Identifiers: On-line systems, SAGE, PDP-1 computer, Programmed instruction.

On-line man-computer communication requires much development before men and computers can work together effectively in formulative thinking and intuitive problem solving. This paper examines some of the directions in which advances can be made and describes on-going programs that seek to improve man-machine interaction in teaching and learning, in planning and design, and in visualizing the internal processes of computers. The paper concludes with a brief discussion of basic problems involved in improving man-computer communication. (Author)

PB-168 574 **Field 5G**
CFSTI Prices: HC$3.00 MF$0.50
Indiana Univ., Bloomington. Linguistics Research Proj.
A PRELIMINARY CLASSIFICATION OF ADVERBS IN ENGLISH,
by Wolfgang Woelck and P. H. Matthews. Aug 65, 58p
Distribution: No limitation.

Descriptors: (*Language, Classification), (*Classification, Language), Catalogs, Vocabulary.

Identifiers: Linguistics, Adverbs, Grammars, English language, Syntax.

The corpus is an alphabetical list of one-word adverbs. The adverbs were examined according to their acceptability in various frames. The criterion for including or excluding a particular adverb with regard to a particular frame was the intuitive reaction of speakers of American English.

PB-168 576 **Field 5G**
CFSTI Prices: HC$1.00 MF$0.50
Indiana Univ., Bloomington. Linguistics Research Proj.
FURTHER CLASSES OF ADJECTIVES,
by Loraine I. Bridgeman, Dale Dillinger, ConstanceHiggins, P. David Seaman, and Floyd A. Shank. Aug 65, 18p
See also PB-166 560. Distribution: No limitation.

Descriptors: (*Language, Classification), (*Classification, Languages), Catalogs, Vocabulary.

Identifiers: Linguistics, Adjectives, Grammars, English language, Syntax.

Adjectives in the lists occur in the frames: (1) Noun Phrase + is + ADJECTIVE + Preposition + Verb-Phrase + ing. (2) Noun-Phrase + is + ADJECTIVE + Preposition + having + Verb-Phrase + ed. Classes of adjectives are delineated by the occurrence of different prepositions in the frame. Prepositions with multiple meanings delineate more than one class.

PB-168 594 **Field 5G**
CFSTI Prices: HC$3.00 MF$0.75
Indiana Univ., Bloomington. Linguistics Research Proj.
MORE CLASSES OF VERBS IN ENGLISH,
by Loraine I. Bridgeman, Dale Dillinger,Constance Higgins, P. David Seaman, and Floyd A. Shank. Aug 65, 92p
Distribution: No limitation.

Descriptors: (*Language, Classification), (*Classification, Language), Catalogs, Vocabulary.

Identifiers: Linguistics, Verbs, Grammars, English language, Syntax.

The format and terminology is as nearly that of Alexander and Kunz (PB-166 561) as was feasible. No term is used in a new way, though it was found necessary to be more explicit in a few cases. Where 'grammatical' affixes are relevant to the frame, they have been indicated, e.g. Verb-Phrase + ed, Verb-Phrase + ing, Noun-Phrase + 's.

PB-168 641 **Field 5B**
CFSTI Prices: HC$2.00 MF$0.50
Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
CLASSIFICATION-INDEXING; A REPORT BIBLIOGRAPHY.
Sep 65, 38p
CFSTI RB-4 canceled
Distribution: No limitation.

Descriptors: (*Classification, Bibliographies), (*Subject indexing, Bibliographies), Automatic, Information retrieval.

Identifiers: Automatic indexing.

The report is a bibliography in the areas of classification, classification techniques, indexing, automatic indexing and subject indexing. It includes only those reports accessioned by the Clearinghouse since July 1964 that are indexed in the Defense Documentation Center computer. The purpose of the bibliography is to present to those in the field of documentation an indication of the current reports available to them through the Clearinghouse.

WAPD-PWR-1606 (Add. 2) **Field 5B, 18L**
CFSTI Prices: HC$3.00 MF$0.50
Bettis Atomic Power Lab., Pittsburgh, Pa.
THE SHIPPINGPORT PRESSURIZED WATER REACTOR PROJECT CATALOG OF DOCUMENT ABSTRACTS.
Jun 65, 58p
Contract AT-11-1-GEN-14
Distribution: No limitation.

Descriptors: (*Pressurized water reactors, Catalogs).

Y-1480 **Field 5A**
CFSTI Prices: HC$4.00 MF$0.50
Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.
AN APPLICATION OF CRITICAL PATH SCHEDULING TO DESIGN ENGINEERING (SANS COMPUTER).
Master's thesis,
by J. H. Boyd, Jr. 1 Mar 65, 103p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Scheduling, Management engineering), (*Engineering, Design).

Identifiers: Critical path method.

6. BIOLOGICAL AND MEDICAL SCIENCES

ANL-6991 **Field 6R**
CFSTI Prices: HC$5.00 MF$1.00
Argonne National Lab., Ill.
RADIATION SAFETY TECHNICIAN TRAINING COURSE. PART I,
by H. J. Moe and S. R. Lasuk. Dec 64, 151p
Contract W-31-109-eng-38
Distribution: No limitation.

Descriptors: (*Radiobiology, Training), (*Health physics, Handbooks).

BNL-9253 **Field 06F, 06R**
CFSTI Prices: HC$5.00 MF$1.00
Brookhaven National Lab., Upton, N. Y.
ECOLOGICAL CHANGES IN THE INSECT COMMUNITY OF A PITCH PINE-OAK FOREST SUBJECTED TO CHRONIC GAMMA IRRADIATION.
Doctoral thesis,
by John H. Brower. 28 May 65, 184p
Contract AT-30-2-GEN-16
Submitted to University of Massachusetts, Amherst, 28 May 1965. Distribution: No limitation.

Descriptors: (*Radiation effects, Insects), (*Ecology, Radiation effects).

BNWL-90 **Field 6R, 6F, 18H**
CFSTI Prices: HC$6.00 MF$1.25
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
EVALUATION OF RADIOLOGICAL CONDITIONS IN THE VICINITY OF HANFORD FOR 1964,
ed. by R. H. Wilson. Jul 65, 206p
Contract AT (45-1)-1830
Distribution: No limitation.

Descriptors: (*Radiological contamination, Washington (State)), (*Radioactive isotopes, Radiological contamination), (*Ecology, Radiological contamination).

CALT-51-3 **Field 6C**
CFSTI Prices: HC$2.00 MF$0.50
Kerchoff Labs. of Biology, California Inst. of Tech., Pasadena.
A COMPARISON OF EARLY DEVELOPMENT AND DIFFERENTIATION IN THE SEA URCHIN EGG WITH ERYTHROPOIESIS AND HEMOGLOBIN SYNTHESIS,
by Henry Borsook. 1965, 27p CONF-650427-1

Contract AT (04-3)-51
Presented at Symposium on Hemoglobin Synthe-

sis, Cambridge, Mass., 8-9 APT 1965. Distribution: No limitation.

Descriptors: (*Embryos, Echinodermata), (*Proteins, Biosynthesis), (*Desoxyribonucleic acids, Embryos), Erythrocytes, Hemoglobin.

COO-1170-6 **Field 6T**
CFSTI Prices: HC$2.00 MF$0.50
Iowa State Univ. of Science and Tech., Ames. Inst. for Atomic Research.
INHALATION EXPOSURE OF MICE TO AN AEROSOL OF GADOLINIUM OXIDE,
by Richard B. Talbot, Fred C. Davision, and William O. Reece. May 65, 23p
Contract AT (11-1)-1170
Prepared in cooperation with Iowa State Univ. of Science and Tech., Ames. Coll. of Veterinary Medicine. Distribution: No limitation.

Descriptors: (*Gadolinium compounds, Oxides), (*Toxicity, Aerosols).

COO-587-2 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Creighton Univ., Omaha, Nebr. School of Medicine.
CA-45 AND SR-85 METABOLISM IN MAN.
Final progress rept. 1 May 58-31 Mar 65.
31 Mar 65, 13p
Contract AT (11-1)-587
Distribution: No limitation.

Descriptors: (*Metabolism, Tracer studies), (*Bone, Metabolism).

HASL-163 **Field 6R**
CFSTI Prices: HC$2.50 MF$0.75
Health and Safety Lab., New York Operations Office (AEC), N. Y.
THE HASL BONE PROGRAM, 1961-1964,
by Joseph Rivera and John H. Harley. 16 Aug 65, 75p
Distribution: No limitation.

Descriptors: (*Radiation effects, Bone), (*Bone, Radiation effects), Strontium, Radioactive isotopes.

HW-SA-3723 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
CORRELATION OF ROSE BENGAL CLEARANCE AND HISTOPATHOLOGICAL CHANGE OF SHEEP LIVERS DAMAGED BY NEPTUNIUM-237,
by D. H. Wood, J. L. Murray, and J. L. Palotay.
18 Sep 64, 8p
Contract AT (45-1)-1350
Distribution: No limitation.

Descriptors: (*Liver, Radiation effects), (*Liver function tests, Radiation effects).

IDO-11300 (Add.) **Field 6H, 18H, 6R**
CFSTI Prices: HC$1.00 MF$0.50
Western Nuclear Corp., Idaho Falls, Idaho.
CURRENT STATUS AND POTENTIAL OF IRRADIATION TO PREVENT POTATO SPROUTING. ADDENDUM,
by George A. Freund. Feb 65, 26p
Contract AT (10-1)-1198
Distribution: No limitation.

Descriptors: (*Potatoes, Irradiated foods), (*Irradiated foods, Potatoes).

KY-484 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Paducah Gaseous Diffusion Plant, Ky.
ENVIRONMENTAL MONITORING SUMMARY FOR THE PADUCAH PLANT FOR 1964,
by R. C. Baker and A. W. Russell. 1 Jul 65, 12p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Isotope separation, Industrial plants), (*Health physics, Isotope separation), Air pollution, Water pollution, Plants (Botany).

LA-DC-6794 **Field 6R, 18B, 18D**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
AUTOMATIC DATA ACQUISITION, REDUCTION AND ANALYSIS,
by P. N. Dean and C. R. Richmond. 1964, 42p
CONF-650507-3 SM-61/34
Contract W-7405-eng-36
Presented at IAEA Symposium on Radioisotope Sample Measurement Techniques in Medicine and Biology, Vienna. Distribution: No limitation.

Descriptors: (*Radiation measurement systems, Data processing systems), (*Data processing systems, Radioactive isotopes).

N65-15378 **Field 6C, 6S**
CFSTI Prices: HC$4.00 MF$1.00
Northrop Space Labs., Hawthorne, Calif.
INVESTIGATION OF PEROGNATHUS AS AN EXPERIMENTAL ORGANISM FOR RESEARCH IN SPACE BIOLOGY.
Progress rept., 1 Oct 63-31 Dec 64,
by J. J. Gambino and R. G. Lindberg. 1964, 129p NSL-64-29-5
Contract NASW-812
NASA CR-60319
Distribution: No limitation.

Descriptors: (*Space biology, Mice).

N65-16431 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
THE PROBLEM OF MAN'S GRAVITATIONAL-INERTIAL FORCE ENVIRONMENT IN SPACE FLIGHT.
Progress rept. no. 2, 1 Jun-30 Sep 63,
by A. Graybiel. 1963, 2p
NASA CR-51786
Distribution: No limitation.

Descriptors: (*Vestibular apparatus, Space medicine).

N65-16432 **Field 6M**
CFSTI Prices: HC$1.00 MF$0.50
Republic Aviation Corp., Farmingdale, N. Y. Space Environment and Life Sciences Lab.
STUDY OF THE NORMAL FECAL BACTERIAL FLORA OF MAN.
Quarterly progress report, Jul-Sep 63,
by L. S. Gall. 7 Oct 63, 5p
Contract NASW 738
NASA CR-52232
Distribution: No limitation.

Descriptors: (*Bacteria, Excretion).

N65-16433 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
THE PROBLEM OF MAN'S GRAVITO-INERTIAL FORCE ENVIRONMENT IN SPACE FLIGHT.
Progress rept. no. 4, 1 Jan-31 Mar 64,
by A. Graybiel. 1964, 4p
NASA CR-56358
Distribution: No limitation.

Descriptors: (*Vestibular apparatus, Space medicine).

N65-16436 **Field 6C, 6S**
CFSTI Prices: HC$1.00 MF$0.50
Northrop Space Labs., Hawthorne, Calif.
BIOLOGICAL AND PHYSIOLOGICAL STUDIES OF PEROGNATHUS/POCKET MICE.
Quarterly status rept. no. 5, 1 Mar-31 May 63,
by R. M. Chew, P. Hayden, and R. G. Lindberg. 1963, 20p
Contract NASR91
NASA CR-50597
Distribution: No limitation.

Descriptors: (*Space biology, Mice).

N65-16483 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
ENERGY DISSIPATION CHARACTERISTICS IN TISSUE FOR IONIZING RADIATION IN SPACE.
Progress rept no. 3, 1 Jun-31 Aug 63,
by H. J. Schaefer. 1963, 2p
NASA CR-51826
Distribution: No limitation.

Descriptors: (*Radiation effects, Tissues (Biology)), (*Tissues (Biology), Radiation effects).

N65-16484 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
ENERGY DISSIPATION CHARACTERISTICS IN TISSUE FOR IONIZING RADIATION IN SPACE.
Progress rept. no. 2, 1 Mar-31 May 63,
by H. J. Schaefer. 1963, 2p
NASA CR-50471
Distribution: No limitation.

Descriptors: (*Radiation effects, Tissues (Biology)), (*Tissues (Biology), Radiation effects).

N65-16485 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
CONDUCT RESEARCH ON THE EFFECT OF VERY STRONG FIELDS AND OF MAGNETIC FIELD-FREE ENVIRONMENTS ON MAN AND ANIMALS.
Progress rept. 1 Feb-30 Apr 64,
by D. E. Belscher. 1964, 2p
NASA CR-56356
Distribution: No limitation.

Descriptors: (*Magnetic fields, Adaptation (Physiology)), (*Space medicine, Magnetic fields).

N65-16486 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
CONDUCT RESEARCH ON THE EFFECT OF VERY STRONG FIELDS AND OF MAGNETIC FIELD-FREE ENVIRONMENTS ON MAN AND ANIMALS.
Progress rept. 1 Aug-31 Oct 63,
by D. E. Beischer. 1963, 3p
NASA CR-52453
Distribution: No limitation.

Descriptors: (*Magnetic fields, Adaptation (Physiology)), (*Space medicine, Magnetic fields).

N65-16598 **Field 6C, 22A**
CFSTI Price: MF$0.75

National Aeronautics and Space Administration, Washington, D. C. Scientific and Technical Information Div.
EXTRATERRESTRIAL LIFE, A BIBLIOGRAPHY. PART I. REPORT LITERATURE, 1952-1964.
Sep 64, 80p
NASA SP-7015, Pt I
Hardcopy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.45.
Distribution: No limitation.

Descriptors: (*Space biology, Bibliographies).

N65-17058 **Field 6C, 6S**
CFSTI Prices: HC$1.00 MF$0.50
St. Louis Univ., Mo.
PHYSIOLOGICAL EFFECTS OF WEIGHTLESSNESS AND SPACE RADIATION ON HIBERNATORS.
Semiannual status rept. no. 2,
by X. J. Musacchia. 6 Jun 63, 5p
Contract NSG271 62
NASA CR-50546
Distribution: No limitation.

Descriptors: (*Rodents, Space biology), (*Weightlessness, Rodents), (*Radiation effects, Rodents).

N65-17289 **Field 6C, 6S**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
THE ORNL SPACE BIOLOGY PROGRAM.
Annual rept. period ending 30 Jun 63,
by M. A. Bender and G. E. Stapleton. 8 Nov 63, 39p ORNL-TM-720
NASA CR-52679
Distribution: No limitation.

Descritors: (*Space biology, Reports).

N65-18049 **Field 6R**
CFSTI Prices: HC$2.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
DOSIMETRIC EVALUATION OF THE ALPHA FLUX IN SOLAR PARTICLE BEAMS,
by Hermann J. Schaefer. 30 Nov 64, 27p Rept. no. NSAM
Proj. MR005 13 1002,
Task 1
Joint rept. with the National Aeronautics and Space Administration, Washington, D. C. Distribution: No limitation.

Descriptors: (*Space flight, Radiation hazards), (*Alpha particles, Dosage), (*Solar flares, Alpha particles).

N65-20753 **Field 6C, 6S**
CFSTI Prices: HC$5.00 MF$1.25
Litton Systems, Inc., St. Paul, Minn. Applied Science Div.
MARS BIOLOGICAL SAMPLE COLLECTION AND PROCESSING STUDY PROGRAM.
Final rept. 15 Nov 63-31 Dec 64,
by D. A. Lundgren, V. W. Greene, and M. J. Grundtner.
1 Feb 65, 183p Rept. no. 2703
Contract NAS7100, JPL950771
NASA CR-57724
Distribution: No limitation.

Descriptors: (*Mars (Planet), Biology).

N65-21338 **Field 6C**
CFSTI Prices: HC$3.00 MF$0.75
Naval School of Aviation Medicine, Pensacola, Fla.
THE INNER EAR ANATOMY OF THE SQUIRREL MONKEY. THE STUDY OF HORIZONTAL SERIAL SECTIONS,
by Makato Igarashi. 16 Jul 64, 90p Monograph no. 8
NASA CR-57931;
NASA R-93
Distribution: No limitation.

Descriptors: (*Semicircular canals, Monkeys).

N65-22165 **Field 6E**
CFSTI Prices: HC$4.00 MF$1.00
California Univ., Los Angeles. Brain Research Inst.
THIRD ANNUAL REPORT, JULY 1, 1963 - JUNE 30, 1964.
30 Jun 64, 149p
NASA CR-62354
Distribution: No limitation.

Descriptors: (*Medical research, Research program administration), (*Brain, Medical research).

N65-28350 **Field 6S, 5J**
CFSTI Prices: HC$4.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
COMPARATIVE EFFECTS OF PROLONGED ROTATION AT 10 RPM ON POSTURAL EQUILIBRIUM IN VESTIBULAR NORMAL AND VESTIBULAR DEFECTIVE HUMAN SUBJECTS,
by Alfred R. Fregly and Robert S. Kennedy. 23 Mar 65, 24p Rept. no. NSAM-920
Proj. MR005 13 6001,
Task 1
NAVMED MR005.13-6001.1-108;
AD 617 754
Distribution: No limitation.

Descriptors: (*Aviation medicine, Vestibular apparatus), (*Vestibular apparatus, Rotation), (*Psychomotor tests, Posture).

N65-30951 **Field 6S**
CFSTI Prices: HC$1.00 MF$1.00
National Aeronautics and Space Administration, Washington, D. C. Scientific and Technical Information Div.
AEROSPACE MEDICINE AND BIOLOGY. A CONTINUING BIBLIOGRAPHY.
Jul 65, 135p
NASA SP-7011 (13))
Distribution: No limitation.

Descriptors: (*Space medicine, Bibliographies), (*Space biology, Bibliographies).

N65-32394 **Field 6S**
CFSTI Price: MF$1.25
National Aeronautics and Space Administration. Washington, D. C.
SPACE MEDICINE IN PROJECT MERCURY,
by Mae Mills Link. 1965, 207p
NASA SP-4003
Handcopy available from Superintendent of Documents, GPO, Wash., D.C. 20402, $1.00. Distribution: No limitation.

Descriptors: (*Space medicine, Space flight), (*Astronauts, Space medicine).

Identifiers: Mercury project.

N65-32674 **Field 6C, 6S, 6F**
CFSTI Prices: HC$3.00 MF$0.75
Emory Univ., Atlanta, Ga.
EFFECT OF WEIGHTLESSNESS AND RADIATION ON THE GROWTH OF THE WHEAT COLEOPTILE FOR THE PURPOSE OF DEFINING AND VERIFYING AN EXPERIMENT SUITABLE FOR USE IN A BIOSATELLITE,
by Stephen Gray and Betty F. Edwards. Sep 65, 64p
Grant NsG521
NASA CR-303
Distribution: No limitation.

Descriptors: (*Wheat, Growth), (*Radiation effects, Wheat), (*Space biology, Wheat).

N65-32926 **Field 6S**
CFSTI Prices: HC$7.00 MF$1.75
Space/Defense Corp., Birmingham, Mich.
THE RESPONSE OF SQUIRREL MONKEYS TO HIGH ACCELERATIVE FORCES,
by John N. Mehelas and Bruce W. Pinc. Jun 65, 323p TR64 111
Contract NASw851
NASA CR-236
Distribution: No limitation.

Descriptors: (*Acceleration tolerance, Monkeys).

N65-33350 **Field 6S, 9B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration. Washington, D. C.
COMPUTER UTILIZATION OF TIME-LINE MEDICAL DATA FROM MAN IN SPACE FLIGHT,
by Jefferson F. Lindsey. Sep 65, 32p
NASA TND-2695
Distribution: No limitation.

Descriptors: (*Space medicine, Data processing systems).

N65-33542 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Texas Inst. for Rehabilitation and Research, Houston.
THE EFFECT OF BEDREST ON VARIOUS PARAMETERS OF PHYSIOLOGICAL FUNCTION. PART V: DIETARY REQUIREMENTS,
by M. Walters, C. Vallbona, D. Cardus, F. B. Vogt, and W. A. Spencer. Sep 65, 21p
Contract NAS9 1461
NASA CR-175
Distribution: No limitation.

Descriptors: (*Diet, Relaxation (Physiology)), (*Relaxation (Physiology), Diet).

NYO-1800-2 **Field 6C**
CFSTI Prices: HC$1.00 MF$0.50
Roscoe B. Jackson Memorial Lab., Bar Harbor, Maine.
ATTEMPTS TO DELINEATE INBORN ANEMIAS IN MICE.
Progress rept. for 1 Feb 64-31 Jan 65,
by Elizabeth S. Russell and Seldon E. Bernstein. 11 Feb 65, 19p
Contract AT (30-1)-1800
Distribution: No limitation.

Descriptors: (*Anemias, Mice).

ORNL-TM-1038 **Field 6R**
CFSTI Prices: HC$3.00 MF$0.75
Oak Ridge National Lab., Tenn.
CALCULATED TISSUE CURRENT-TO-DOSE CONVERSION FACTORS FOR NUCLEONS BELOW 400 MEV,
by C. D. Zerby and W. E. Kinney. May 65, 81p

Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Tissues (Biology), Radiation effects), (*Nucleons, Dose rate).

Patent Design 202,539 **Field 6Q**
HELMET.
Patent assigned to NASA,
by Norman D. Atlas and Jerome F. Madden. 19 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Helmets, Design), Patents.

The helmet is designed to cover the upper part of the head including the forehead, the back of the head and the area above the ears of the wearer. Integral with the structure are two projecting parts of generally rectangular cross section which extends each from the area of the temples to the back of the head. These two parts appear to function as shock absorbers.

Patent 3,208,080 **Field 6Q**
PROTECTIVE HELMET.
Patent assigned to Navy,
by Arthur E. Hirsch. 28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Helmets, Astronauts), Nylon, Expanded plastics, Patents.

The helmet is designed for use in space. It may be collapsed for storage. It is made of a plurality of overlapping segments of a nylon laminate and an inner liner of segments of a foamed plastic. The entire helmet is enclosed in a cloth bag with stitching between the segments to hold them together.

Patent 3,211,557 **Field 6H**
PROCESS FOR FORTIFYING THE FLAVOR OF PRUNE JUICE.
Patent assigned to Agriculture,
by Fredoon S. Nury and Glenn G. Watters. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Fruits, Beverages), (*Beverages, Processing), Patents.

Prune juice of improved flavor is prepared by producing a juice from fresh prunes, grinding prune pits and extracting the ground prune pits with water to prepare a pit extract containing prune flavor components. A major proportion of the juice is admixed with a minor proportion of the pit extract.

Patent 3,211,740 **Field 6H, 7C**
RECOVERY OF FLAVORING COMPONENTS FROM ESSENTIAL OILS.
Patent assigned to Agriculture,
by William L. Stanley, Robert M. Ikeda, Sadie H.Vannier and Lawrence A. Rolle. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Aldehydes, Separation), (*Ketones, Separation), (*Food, Processing), (*Vegetable oils, Processing), Hydrazine derivatives, Hydrazones, Propanols, Solvent extraction, Taste, Patents.

Identifiers: Flavoring substances, Isopropanols.

The process may be applied to any essential oil from which it is desired to isolate the flavoring components having an aldehyde or ketone structure, for example, lemon, orange, lime, citronella, rose, strawberry and other oils. The oil is reacted with a hydrazine derivative in the presence of an isopropyl alcohol to convert the aldehydes and ketones into water-soluble hydrazone derivatives. These are treated to obtain the flavoring components.

PB-168 505 **Field 6F**
CFSTI Prices: HC$1.00 MF$0.50
Weather Bureau, Washington, D. C.
WEATHER AND APHIDS: A REVIEW,
by Ray E. Jensen and Jack R. Wallin. Sep 65, 23p Technical note TN-5-AGMET-1
Distribution: No limitation.

Descriptors: (*Hemiptera, Ecology), (*Ecology, Hemiptera), (*Insect control, Meteorological parameters), (*Meteorological parameters, Insect control), Plants (Botany), Disease vectors, Rhythm (Biology).
Identifiers: Aphids.

Aphids are vectors of many plant diseases, including barley yellow dwarf virus, and aphid migration can be of economic importance. The meteorological considerations of conditions necessary for long-range migration are reviewed as well as flight and other behavioral traits of aphids. From this information, a technique is suggested for forecasting long-range aphid migrations from synoptic weather patterns. (Author)

PB-168 561 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
THE EFFECT OF FRACTIONATING 100 R HARD X-RAY DOSES ON THE HAEMOGRAM AND PROTEINOGRAM OF THE RABBIT (Action du Fractionnement de 100 R de Rayons X sur l'Hemogramme et le Proteinogramme du Lapin),
by Denise Alix. Sep 65, 24p Rept. no. CEA-R-2865
Text in French, attached summary in English. Distribution: No limitation.

Descriptors: (*Blood counts, Radiation effects), (*Blood proteins, Radiation effects), Leukocytes, Albumins, Gamma globulin, X rays, Radiological dosage, Metabolism, Mitosis, Statistical analysis.

Eighty-one rabbits received total exposure of 100 X-rays, by fractionnal doses of 5 - 10 - 25 - 50 and 100 R per irradiation. Blood count and protein dosage were practised before, during and after the irradiation time. Seventeen controls were subjected to the same investigations with the same periodicity. Statistical analysis of experimental data revealed that irradiation induces a drop in the leucocyte count, resulting from a decrease in mononuclear cells. On the other hand, it is more difficult to determine its action on the protein profiles, because the observed changes were likewise observed on the controls, although at a lesser degree. The authors conclude that it may be due to an increase of albumin concentration and to some instability of the gamma-globulins concentration. They discuss the possible mechanisms of X-rays effects: either perturbations of protein metabolism following loss of mitotic activity or histolysis.

RL-SA-15 **Field 6R, 18G**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
RADIATION CONTROL OF ACCIDENTALLY CONTAMINATED SEEPAGE PONDS,
by G. E. Backman and L. W. Roddy. 3 Jun 65, 18p CONF-650616-2
Contract AT (45-1)-1350
Presented at the Health Physics Society, Annual Meeting Los Angeles. Distribution: No limitation.

Descriptors: (*Radiological contamination, Water), (*Water pollution, Radiological contamination).

TID-20745 **Field 6R**
CFSTI Prices: HC$2.00 MF$0.50
Michigan Univ., Ann Arbor. Dept. of Psychology.
IRRADIATION OF HYPOTHALAMIC REWARD SUBSTRATE IN RAT.
Final rept.,
by James Olds, and Marianne E. Olds. Apr 64, 36p ORA-04289-3F
Contract AT (11-1)-953,
Proj. ORA 04289
Distribution: No limitation.

Descriptors: (*Radiation effects, Conditioned reflex), (*Conditioned reflex, Radiation effects), Thalamus, Stimulation.

TID-21106 **Field 6E**
CFSTI Prices: HC$2.00 MF$0.50
Northwestern Univ., Chicago, Ill. Dept. of Pathology.
INCORPORATION OF THYMIDINE INTO DNA OF ORGANS OF MICE,
by H. Richard Hinrichs, Robert O. Petersen, and Renato Baserga. 1964. 30p
Contract AT (11-1)-1131
Distribution: No limitation.

Descriptors: (*Desoxyribonucleic acids, Nucleosides), (*Nucleosides, Cancer), (*Cancer, Desoxyribonucleic acids).

TID-21695 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Birmingham-Southern Coll., Ala. Dept. of Biology.
A COMPARISON OF X-RAY- AND ULTRAVIOLETINDUCED ABERRATIONS IN POLLEN TUBE CHROMOSOMES OF TRADESCANTIA.
Final rept.,
by Paul C. Bailey. 12 Feb 65, 25p
Contract AT (40-1)-3222
Distribution: No limitation.

Descriptors: (*Radiation effects, Chromosomes), (*Chromosomes, Radiation effects), (*Mutations, Chromosomes).

TID-21710 (Rev.) **Field 6H, 18B**
CFSTI Prices: HC$4.00 MF$0.75.
Southern Interstate Nuclear Board, Atlanta, Ga.
STUDY OF APPLICABILITY OF RADIATION PASTEURIZATION OF FRUITS IN THE SOUTH.
15 Sep 64, 110p
Contract AT (38-1)-366
Distribution: No limitation.

Descriptors: (*Irradiated foods, Fruits), (*Fruits, Pasteurization), (*Pasteurization, Irradiated foods).

TID-21710 **Field 6H, 18B, 6R**
CFSTI Prices: HC$4.00 MF$1.00
Southern Interstate Nuclear Board, Atlanta, Ga.
STUDY OF APPLICABILITY OF RADIATION PASTEURIZATION OF FRUITS IN THE SOUTH.
15 Sep 64, 118p
Contract AT (38-1)-368
Distribution: No limitation.

Descriptors: (*Irradiated foods, Fruits), (*Pasteurization, Irradiated foods).

TID-21713 **Field 6C, 6R, 18G, 18B**
CFSTI Prices: HC$4.00 MF$0.75
Savannah River Ecology Lab., Aiken, S. C.
ONSITE ECOLOGICAL RESEARCH OF THE DIVISION OF BIOLOGY AND MEDICINE AT THE SAVANNAH RIVER ECOLOGY LABORATORY,
ed. by Frank B. Golley and Ann H. Loyal. Jan 65, 103p
Prepared in cooperation with Georgia Univ., Athens. Inst. of Radiation Ecology. Distribution: No limitation.

Descriptors: (*Ecology, Scientific research), (*Radiation effects, Ecology), (*Radioactive isotopes, Ecology).

TID-21764 **Field 6R, 6H, 18H**
CFSTI Prices: HC$2.00 MF$0.50
Southwestern Radiological Health Lab., Las Vegas, Nev.
DAIRY FARM RADIOIODINE STUDY FOLLOWING THE PIKE EVENT,
by Delbert S. Barth and Joel G. Veater. 23 Nov 64, 44p
Distribution: No limitation.

Descriptors: (*Radioactive fallout, Bovines), (*Bovines, Radiation effects), Milk, Health physics.

TID-22078 **Field 6C**
CFSTI Prices: HC$2.00 MF$0.50
Brigham Young Univ., Provo, Utah.
A COMPARATIVE POPULATION STUDY OF SMALL VERTEBRATES IN THE URANIUM ARE AS OF THE UPPER COLORADO RIVER BASIN OF UTAH,
by Wilmer W. Tanner. May 65, 40p
Contract AT (11-1)-819
Published as Brigham Young Univ. Sci. Bull., Biol. Ser., 7 No. 1, May 1965. Distribution: No limitation.

Descriptors: (*Vertebrates, Utah).

UCRL-14116 **Field 6R, 18D, 18F**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
INDEX TO HAZARDS CONTROL.
Quarterly repts. nos. 1 through 19,
comp. by Seymour Block, Ross Kusian, Ronald Kathren, Carl Lindeken, and Victor Schimmelfenning. 23 May 65, 42p
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Radiation hazards, Indexes).

UCRL-14151 **Field 6R, 18D, 18F, 18I**
CFSTI Prices: HC$3.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Livermore.
HAZARDS CONTROL.
Quarterly rept. no. 20, Jan-Mar 65.
Mar 65, 63p
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Radiation hazards, Control), (*Radiation monitors, Design).

UR-663 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Rochester Univ., N. Y. Atomic Energy Project.
PLATELET SIZE DISTRIBUTION FOLLOWING XIRRADIATION,
by R. O. Spertzel, T. J. Bucci, and M. Ingram. 29 Jan 65, 16p CONF-19-5
Contract W-7405-eng-49
Presented at the International Congress of Radiation Research (2nd), Harrogate, Eng., 5-11 Aug. 1962. Distribution: No limitation.

Descriptors: (*Blood platelets, Radiation effects), (*Radiation effects, Blood platelets).

UR-664 **Field 6E, 6M**
CFSTI Prices: HC$1.00 MF$0.50
Rochester Univ, N. Y. Atomic Energy Project.
EFFECT OF LIPOPOLYSACCHARIDE FROM S. MARCESCENS ON MURPHY-STURM RAT LYMPHOSARCOMAS,
by Ma. de los Angeles Contreras. 9 Mar 65, 24p

Contract W-7405-eng-49
Distribution: No limitation.

Descriptors: (*Polysaccharides, Cancer), (*Toxins + antitoxins, Cancer), (*Serratia marcescens, Toxins + antitoxins).

UR-665 **Field 6R**
CFSTI Prices: HC$3.00 MF$0.50
Rochester Univ., N. Y. Atomic Energy Project.
PLUTONIUM UPTAKE BY ANIMALS EXPOSED TO A NON-NUCLEAR DETONATION OF A PLUTONIUMBEARING WEAPON SIMULANT. PART I. FIELD OPERATIONS,
by R. H. Wilson and J. L. Terry. 14 Apr 65, 45p

Contract W-7405-eng-49
Distribution: No limitation.

Descriptors: (*Plutonium, Metabolism).

UR-667 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Rochester Univ., N. Y. Atomic Energy Project.
THE EFFECT OF WIDE X-RAY BEAM AND FINITE PHANTOM THICKNESS ON 1000 KVP X-RAY DEPTH DOSE,
by H. D. Maillie and H. Mermagen. 24 May 65, 21p
Contract W-7401-eng-49
Distribution: No limitation.

Descriptors: (*Radiological dosage, X-rays).

UWFL-86 **Field 6R**
CFSTI Prices: HC$3.00 MF$0.75
Washington Univ., Seattle. Lab. of Radiation Biology.
RADIONUCLIDES OF COLUMBIA RIVER ORIGIN IN MARINE ORGANISMS, SEDIMENTS, AND WATER COLLECTED FROM THE COASTAL AND OFFSHORE WATERS OF WASHINGTON AND OREGON, 1961-1963,
by Allyn H. Seymour and Gary B. Lewis. 10 Dec 64, 78p
Contract AT (45-1)-1385
Distribution: No limitation.

Descriptors: (*Radiobiology, Rivers), (*Radiological contamination, Marine biology), Ecology.

UWFL-88 **Field 6R**
CFSTI Prices: HC$2.00 MF$0.50
Washington Univ., Seattle. Lab. of Radiation Biology.
RADIONUCLIDE CONTENT OF OCEANIC FISH, PLANKTON, AND WATER IN THE VICINITY OF CHRISTMAS ISLAND, MARCH THROUGH AUGUST 1962,
by Arthur D. Welander and Ralph F. Palumbo. 4 Sep 63, 50p
Contract AT (45-1)-1385
Distribution: No limitation.

Descriptors: (*Radiological contamination, Marine biology).

WASH-1059 **Field 6R**
CFSTI Prices: HC$4.50 MF$1.50
Division of Biology and Medicine (AEC), Washington, D. C.
LATE IRRADIATION EFFECTS CONFERENCE. INVENTORY OF CAPABILITY. SUMMARY OF PROCEEDINGS, 4-6 Dec 63, GERMANTOWN, MARYLAND,
ed. by Paul S. Henshaw. May 65, 348p
Contract CONF-631203
Distribution: No limitation.

Descriptors: (*Radiation effects, Symposia).

7. CHEMISTRY

BNWL-SA-166 **Field 7B, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
AUTOMATED PROCEDURE FOR ZIRCONIUM ANALYSIS IN WATER,
by T. F. Demmitt. 2 Aug 65, 11p
Contract AT (45-1)-1830
Distribution: No limitation.

Descriptors: (*Zirconium, Determination).

BNWL-SA-167 **Field 7B, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
AUTOMATED PROCEDURE FOR H3B03 ANALYSIS IN WATER.
by T. F. Demmitt. 2 Aug 65, 12p
Contract AT (45-1)-1830
Distribution: No limitation.

Descriptors: (*Boric acids, Chemical analysis), (*Chemical analysis, Automation).

BNWL-113-2 **Field 7E, 7B, 18H, 11F,2**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
PLUTONIUM ABSTRACTS. VOLUME 5, NO. 2.
10 Mar 65, 11p
Contract AT (45-1)-1830
Distribution: No limitation.

Descriptors: (*Plutonium, Scientific research), Reports, Abstracting, Reactor materials.

BNWL-113-4 **Field 7E, 7B, 18H, 11B,2**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
PLUTONIUM ABSTRACTS. VOLUME 5, NO. 4.
28 May 65, 18p
Contract AT (45-1)-1830
Distribution: No limitation.

Descriptors: (*Plutonium, Scientific research), Reports, Abstracting, Reactor materials.

CONF-650918-2 **Field 7C, 7A, 18B**
CFSTI Prices: HC$2.00 MF$0.50
Du Pont de Nemours (E. I.) and Co., Inc., Aiken, S. C. Savannah River Lab.
SELECTION, COST, AND PERFORMANCE OF n-PARAFFIN DILUENTS,
by A. L. Marston, D. L. West, and R. N. Wilhite. 29 Jul 65, 32p
Contract AT (07-2)-1
Presented at International Conference on the Chemistry of the Solvent Extraction of Metals, Harwell, Berks, England Sep 1965. Distribution: No limitation.

Descriptors: (*Solvent extraction, Isotope separation), (*Isotope separation, Solvents), Alkanes, Costs, Selection, Performance (Engineering).

CONF-650919-1 **Field 7B, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Du Pont de Nemours (E. I.) and Co., Inc., Aiken, S. C. Savannah River Lab.
AUTOMATED PROCEDURES FOR LITHIUM, COBALT, AND THORIUM AND THEIR APPLICATIONS IN NUCLEAR PROCESSES,
by R. H. Gaddy. 4 Aug 65, 27p
Contract AT (07-2)-1
Presented at Technicon Analytical Symposium, New York. Distribution: No limitation.

Descriptors: (*Lithium, Chemical analysis), (*Cobalt, Chemical analysis), (*Thorium, Chemical analysis), (*Chemical analysis, Automation), (*Radioactivation analysis, Automation).

COO-1032-1 **Field 7E**
CFSTI Prices: HC$2.00 MF$0.50
Minnesota Univ., Minneapolis. Dept. of Chemical Engineering.
RECOMBINATION OF HYDROGEN AND OXYGEN IN THE PRESENCE OF WATER VAPOR UNDER THE INFLUENCE OF RADIATION.
Final rept.,
by B. M. Benjamin and H. S. Isbin. Jul 65, 36p

Contract AT (11-1)-1032
Distribution: No limitation.

Descriptors: (*Recombination reactions, Radiation chemistry), (*Hydrogen, Oxygen), Water vapor.

DP-962 **Field 7E**
CFSTI Prices: HC$1.00 MF$0.50
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
PURIFICATION OF 244Cm and 250Cf-252Cf FOR RADIATION PROPERTY MEASUREMENTS,
by H. Perry Holcomb. Apr 65, 13p
Contract AT (07-2)-1
Distribution: No limitation.

Descriptors: (*Radiochemistry, Curium), (*Californium, Purification).

DP-986 **Field 7E, 18H**
CFSTI Prices: HC$1.00 MF$0.50
DuPont de Nemours (E. I.) and Co., Aiken S. C. Savannah River Lab.
RADIATION PROPERTIES OF CALIFORNIUM-252,
by Dean H. Stoddard. Jun 65, 12p
Contract AT (07-2)-1
Distribution: No limitation.

Descriptors: (*Californium, Radioactivity), Radioactive isotopes.

HW-77805 **Field 7A, 7E**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
DEVELOPMENT IN CONTINUOUS ION EXCHANGE CONTACTORS.
Progress rept.,
by H. L. Brandt. 7 Jun 63, 18p
Contract AT (45-1)-1350
Distribution: No limitation.

Descriptors: (*Ion exchange, Radiochemistry), (*Radiochemistry, Ion exchange resins).

HW-82103 **Field 7B, 7A, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
LABORATORY STUDIES ON THE USE OF URANIUM (IV) AS A PLUTONIUM REDUCTANT IN A PUREX PROCESS,
by J. E. Mendel. Jun 65, 14p
Contract AT (45-1)-1350
Distribution: No limitation.

Descriptors: (*Solvent extraction, Plutonium), (*Reduction (Chemistry), Uranium).

LA-DC-6413 **Field 7C, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Oklahoma State Univ., Stillwater. Dept. of Chemistry.
TETRAMETHYLLEAD: FAR INFRARED SPECTRA, MOLECULAR VIBRATIONS, AND CHEMICAL THERMODYNAMIC PROPERTIES. RESOLUTION OF AN ENTROPY DISCREPANCY,
by G. A. Crowder, G. Gorin, and F. H. Kruse. 1962, 16p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Lead compounds, Entropy), (*Metalorganic compounds, Lead compounds).

Identifiers: Tetramethyl lead.

LA-DC-7013 **Field 7B, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
KINETIC STUDIES ON EXTRACTION OF EUROPIUM BY LITHIUM AMALGAM AND COMPARISON TO REMOVAL BY ELECTROLYSIS,
by E. I. Onstott, and John F. Goddard. 1964, 9p
CONF-650804-4
Contract W-7405-eng-36
Presented at the Rare Earth Research Conference (5th) Ames, Iowa. Distribution: No limitation.

Descriptors: (*Europium, Separation), (*Lithium, Mercury alloys).

LA-3147-MS **Field 7D, 20F**
CFSTI Prices: HC$3.00 MF$0.75
Los Alamos Scientific Lab., Univ. of California, N. Mex.
MEASUREMENTS OF THE ABSOLUTE FLUORESCENCE EFFICIENCY OF AIR UNDER ELECTRON BOMBARDMENT,
by Paul L. Hartman. Jan 64, 54p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Air, Fluorescence), (*Electron bombardment, Air).

LA-3297 **Field 7D, 19A**
CFSTI Prices: HC$3.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
A STUDY OF THE ONE-DIMENSIONAL, TIMEDEPENDENT REACTION ZONE OF NITROMETHANE AND LIQUID TNT,
by Charles L. Mader. 6 Apr 65, 51p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*TNT, Reaction kinetics), (*Reaction kinetics, TNT).

LA-3314 **Field 7E**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
THE SPECTROPHOTOMETRIC DETERMINATION OF PLUTONIUM AS THE ARSENAZO I COMPLEX,
by J. W. Dahlby and G. R. Waterbury. 30 Apr 65, 11p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Spectroscopy, Plutonium), (*Complex compounds, Plutonium compounds).

MCW-1492 **Field 7D, 11F, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Mallinckrodt Chemical Works, Weldon Spring, Mo. Uranium Div.
PROCESS DEVELOPMENT.
Quarterly progress rept. for Jan-Mar 65.
1 May 65, 24p
Contract W-14-108-eng-8
Distribution: No limitation.

Descriptors: (*Uranium, Metallurgy), (*Thorium compounds, Chemical analysis), (*Spectroscopy, Uranium).

MLM-1256 **Field 7E**
CFSTI Prices: HC$1.00 MF$0.50
Mound Lab., Miamisburg, Ohio.
NEW TECHNIQUES IN THE GAMMA ACTIVATION ANALYSIS OF BERYLLIUM,
by H. L. Rook. 19 Apr 65, 6p
Contract AT-(33-1)-GEN-53
Distribution: No limitation.

Descriptors: (*Radioactivation analysis, Beryllium), (*Beryllium, Radioactivation analysis).

MSAR-65-95 **Field 7B, 11F**
CFSTI Prices: HC$2.00 MF$0.50
MSA Research Corp., Callery, Pa.
DEVELOPMENT OF TECHNIQUES FOR MEASUREMENT OF IMPURITIES IN SODIUM.
Quarterly progress rept. for Apr-Jun 65.
30 Jul 65, 46p
Contract AT (11-1)-765
Distribution: No limitation.

Descriptors: (*Sodium, Impurities), Measurement.

N65-16481 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
Naval Research Lab., Washington, D. C.
STARK PROFILE MEASUREMENT OF THE LYMAN-ALPHA AND LYMAN-BETA LINES OF HYDROGEN,
by R. C. Elton. 17 Jul 63, 32p Rept. no. NRL5967
Proj. RR002 10 45 5054
NASA CR-52912
Distribution: No limitation.

Descriptors: (*Hydrogen, Stark effect), (*Line spectrum, Hydrogen).

N65-17062 **Field 7B, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Cornell Univ., Ithaca, N. Y. Dept. of Chemistry.
THE THERMAL DECOMPOSITION OF CICN,
by S. H. Bauer, D. Schofield, and W. Tsang. 1963, 31p
Grant NsG116 61
NASA CR-50672
Presented at Am. Chem. Soc. meeting, Sep 1963.
Distribution: No limitation.

Descriptors: (*Cyanogen, Pyrolysis), (*Chlorides, Pyrolysis).

Identifiers: Cyanogen chloride.

N65-25970 **Field 7C, 11I**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration Marshall Space Flight Center, Huntsville, Ala.
STUDIES IN SILAZANE CHEMISTRY.
by James D. Byrd and James E. Curry. 1 Feb 65, 37p
NASA TMX-53197
Distribution: No limitation.

Descriptors: (*Organic nitrogen compounds, Silicon compounds), (*Silicon compounds, Organic nitrogen compounds), Silicon components.

Identifiers: Silazanes.

N65-26046 **Field 7D**
CFSTI Prices: HC$4.00 MF$1.00
Western Ontario Univ., London. Dept. of Physics.
CONDON LOCI OF DIATOMIC MOLECULAR SPECTRA.
Master Thesis,
by Mary Frances Murty. 8 Oct 64, 126p
Grants NsG-349, AF-AFOSR-62-236
NASA CR-63237
Distribution: No limitation.

Descriptors: (*Diatomic molecules, Band spectrum), (*Molecular spectroscopy, Band spectrum).

NAA-SR-11401 **Field 7D, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Atomics International, Canoga Park, Calif.
KINETICS OF THE REACTION OF URANIUM MONOCARBIDE WITH WATER,
by L. J. Colby, Jr. 25 Jul 65, 16p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Reaction kinetics, Uranium compounds), (*Uranium compounds, Carbides).

NYO-2978-34 **Field 7C, 20H**
CFSTI Prices: HC$3.00 MF$0.75
Consolidation Coal Co., Library, Pa. Research Div.
EVALUATION OF BETA RADIATION AS A HYDROGENATION CATALYST.
Interim technical status rept. 1 Mar 62-31 Oct 63, by P. M. Yavorsky and E. Gorin. 11 Sep 64, 78p

Contract AT (30-1)-2978
Distribution: No limitation.

Descriptors: (*Beta particle reactions, Hydrogenation), (*Hydrogenation, Beta particle reactions), (*Catalysts, Beta particle reactions).

ORNL-P-1151 **Field 7A, 18L**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
FACTORS AFFECTING ANALYSIS OF DUAL-PURPOSE DESALINATION PLANTS,
by C. C. Burwell, R. A. Ebel, and R. P. Hammond. 1965, 30p CONF-650420-1
Contract W-7405-eng-26
Prepared for Presentation at the IAEA Panel Meeting on Use of Nuclear Energy in Saline Water Conversion (5th), Vienna, Austria, 5-9 Apr 1965. Distribution: No limitation.

Descriptors: (*Desalination, Power supplies), (*Power reactors, Desalination).

ORNL-P-491 **Field 7B, 7E**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
SOME FLUORINE COMPOUNDS OF RHENIUM AND TECHNETIUM,
by D. E. LaValle, R. M. Steele, and Wm. T. Smith, Jr. 1963, 27p
Contract W-7405-eng-36
Prepared in cooperation with Tennessee Univ., Knoxville. Dept. of Chemistry. Distribution: No limitation.

Descriptors: (*Rhenium compounds, Fluorine compounds), (*Technetium compounds, Fluorine compounds), (Fluorine compounds, Rhenium compounds).

ORNL-TM-989 **Field 7B, 14B**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
A LITERATURE REVIEW OF MASS SPECTROMETRICTHERMOCHEMICAL TECHNIQUE APPLICABLE TO THE ANALYSIS OF VAPOR SPECIES OVER SOLID INORGANIC MATERIALS,
by J. D. Redman. 1964, 50p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Mass spectroscopy, Vapors), (*Thermochemistry, Vapors), (*Vapors, Chemical analysis).

Patent 3,211,526 **Field 7A, 7B, 11F, 18J**
RECOVERY OF SULFURIC ACID FROM AN AQUEOUS SOLUTION CONTAINING METAL VALUES BY EXTRACTION WITH TERTIARY AMINES.
Patent assigned to AEC,
by David J. Crouse, Jr. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Sulfuric acid, Solvent extraction), Solutions, Amines, Benzenes, Pickling, Reactor fuel processing, Reactor fuel cladding, Patents.

Identifiers: Benzyl di (ethylhexyl) amines, Di (ethylhexyl) hexylamines.

The process is for the recovery of sulfuric acid from solutions resulting from the pickling of steel or the removal of cladding from nuclear reactor fuel elements. The solutions contain metal values. The aqueous solution is contacted with a water-immiscible organic diluent and a tertiary amine such as N-benzyl-di (2-ethylhexyl) amine and separating the resulting sulfuric acid-containing organic solution from the aqueous solution. The latter is contacted with water to form an aqueous sulfuric acid solution.

PB-168 567 **Field 7C**
CFSTI Prices: HC$6.00 MF$1.25
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
SYNTHESIS AND PURIFICATION OF SOME ALKYL- PHENANTHRENES AND PRESENTATION OF THEIR INFRARED, ULTRAVIOLET, NUCLEAR MAGNETIC RESONANCE AND MASS SPECTRA (Synthese et Purification de Quelques Alcoylphenanthrenes et Presentation de leurs Spectres d'Absorption Infrarouge, Ultraviolette, de Resonance Magnetique Nucleaire et de Masse).
Doctoral thesis,
by Kim Persaud. 1965, 206p Rept. no. CEA-R-2770
Text in French, Attached summary in English. Available copy will not permit fully legible reproduction. Distribution: No limitation.

Descriptors: (*Phenanthrenes, Chemical properties), (*Infrared spectroscopy, Phenanthrenes), (*Ultraviolet spectroscopy, Phenanthrenes), (*Mass spectroscopy, Phenanthrenes), (*Nuclear magnetic resonance, Phenanthrenes), Synthesis (Chemistry), Purification, Polycyclic compounds, France.

The following were realized: phenanthrene, its five monomethyl derivatives, three dimethyl derivatives, and two trimethyl derivatives. These products, as well as a certain number of others obtained from various sources, were then purified. In the majority of cases, a purity of 99.5 per cent or over was obtained, these figures being obtained by low voltage mass spectrometry. The infrared, ultraviolet, nuclear magnetic resonance and mass spectra of these products were recorded, for which an atlas was drawn up. (Author)

PB-168 568 **Field 7C**
CFSTI Prices: HC$3.00 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
CONTRIBUTION TO THE STUDY OF THE MECHANISM OF EXTRACTION OF URANYL CHLORIDE BY LONG CHAIN ALIPHATIC AMINES (Contribution a l'Etude du Mecanisme d'Extraction du Chlorure d'Uranyle par les Amines Aliphatiques a Longues Chaines).
Doctoral thesis,
by Georges R. Rubinstein. 1965, 80p Rept. no. CEA-R-2742
Text in French, attached summary in English. Distribution: No limitation.

Descriptors: (*Uranyl radicals, Chlorides), (*Chlorides, Uranyl radicals), Synthesis (Chemistry), Amines, Reaction kinetics, Complex compounds, Uranium compounds, France.

After having studied and developed the mechanisms which may 'a priori' explain the extraction process (co-ordination, ion association or intermediate mechanism), experience shows that ion association only should be taken into consideration. The structure of the organic complex of uranyl chloride has been defined on the basis of the study of the variation of the distribution coefficient of uranium between the two phases at the equilibrium as a function of successively the activity of C1- ions in the aqueous phase, the concentration of amine salt in the organic phase and finally of the concentration of uranium in the aqueous phase. The plotting of the results in bilogarithmic co-ordinates enables us to propose the following formula for the extracted compound: UO2 Cl4 -- (NR3H ;)2. The calculation of the equilibrium constant of formation of the organic compound of uranyl chloride has been possible in the case of diluted solutions of uranium only. (Author)

PB-168 570 **Field 7E, 18I, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
RADIOLYSIS OF SOME AQUEOUS SOLUTIONS OF NEUTRON ABSORBERS (Etude des Effets de Certains Absorbeurs de Neutrons en Solution sur la Radiolyse de l'Eau).
Doctoral thesis,
by Jean Rozenberg. 1965, 48p Rept. no. CEA-R-2794
Text in French, attached summary in English. Distribution: No limitation.

Descriptors: (*Radiation chemistry, Neutron absorbers), (*Neutron absorbers, Solutions), Heavy water reactors, Salts, Cadmium compounds, Gadolinium compounds, Water, Decomposition, Hydrogen, France.

The initial yield of molecular hydrogen formed by radiolytic decomposition of water in reactor and Co (60) gamma radiation is decreased by the presence of salts of polyvalent elements possessing only one stable valence, i.e. cadmium, zinc, magnesium, gadolinium. This effect is favourable for the use of cadmium and gadolinium as soluble neutron absorber in heavy water reactors. Cations of these salts are not inert toward the primary products of water radiolysis. They have a high degree of reactivity toward the hydrated electron, which is the precursor of molecular hydrogen in neutral or alkaline aqueous media. The value of the rate constant for the reaction between cadmium ion and hydrated electron was shown to be (6,1 ± 1,8) 10 to the 10th power/Ms. Boric acid at low concentration has no effect on the radiation chemistry of water. (Author)

PWAC-380 **Field 7D, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Pratt and Whitney Aircraft, Middleton, Conn. Aircraft Nuclear Engine Lab.
THE SOLUBILITY OF HELIUM IN LITHIUM AND POTASSIUM,
by H. Slotnick, S. M. Kapelner, and R. E. Cleary. 24 Feb 65, 26p
Contract AT (30-1)-2789
Distribution: No limitation.

Descriptors: (*Helium, Solubility), Lithium, Potassium, Liquid metals.

RFP-516A **Field 7E, 18I, 18B**
CFSTI Prices: HC$0.50 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
UNCLASSIFIED PUBLICATIONS THROUGH 1964.
29 Mar 65, 38p
Contract AT (29-1)-1106
Distribution: No limitation.

Descriptors: (*Nuclear engineering, Reports), Radioactive isotopes, Reactor materials.

RFP-538 **Field 7E**
CFSTI Prices: HC$1.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
OBSERVATIONS OF GAMMA EMISSIONS ASSOCIATED WITH THORIUM REMOVAL FROM A U 233 SAMPLE,
by R. A. Kirchner and K. J. Freiberg. 16 Jun 65, 19p
Contract AT (29-1)-1106
Distribution: No limitation.

Descriptors: (*Gamma emission, Thorium), (*Radiochemistry, Thorium).

RFP-564 **Field 7D, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
A COMPUTER PROGRAM TO CONVERT GAS ANALYSIS DATA FROM UNITS OF VOLUME PERCENT TO MOLAR QUANTITIES,
by C. A. Larson. 18 Jun 65, 13p
Contract AT (29-1)-1106
Distribution: No limitation.

Descriptors: (*Gas analysis, Programming (Computers)), (*Programming (Computers), Gas analysis).

SC-RR-65-160 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
PROPERTIES OF MOLECULAR SIEVE-TYPE DESICCANTS.
by George Voida. May 65, 40p
Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Desiccants, Adsorption), Moisture.

SRIA-118 **Field 7B, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif.
THE CRITICAL TEMPERATURE AND COEXISTENCE CURVE FOR BISMUTH CHLORIDE.
Technical rept.,
by J. W. Johnson and Daniel Cubicciotti. 26 Feb 64, 14p Rept. no. TR-24
Contract AT (04-3)-106,
Proj. SRI SU1827
Distribution: No limitation.

Descriptors: (*Bismuth compounds, Electrical conductance), (*Chlorides, Electrical conductance).

Identifiers: Bismuth chloride.

SRIA-122 **Field 7B, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif.
THERMODYNAMICS OF VAPORIZATION OF LIQUID THALLOUS BROMIDE AND ITS GASEOUS DIMERIZATION.
Technical rept.,
by Daniel Cubicciotti. 26 Jun 64, 14p Rept. no. TR-26
Contract AT (04-3)-106,
Proj. SRI SU1827
Distribution: No limitation.

Descriptors: (*Thallium compounds, Vaporization), (*Bromides, Vaporization).

Identifiers: Thallium bromides.

SRIA-425-4 **Field 7D, 11F**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Research Inst., Menlo Park, Calif.
SORPTION OF GASES ON METAL SURFACES IN ULTRAHIGH VACUUM.
Annual rept. for Feb 15 64 - 14 Feb 65,
by B. Berganov-Hansen, N. Endow, and R. A. Pasternak. 23 Mar 65, 71p
Contract AT (04-3)-425,
Proj. SRI PAU3994
Distribution: No limitation.

Descriptors: (*Molybdenum, Adsorption), (*Nitrogen, Sorption).

TID-21020 **Field 7D, 7C, 10A**
CFSTI Prices: HC$2.00 MF$0.75
Martin Co., Baltimore, Md. Nuclear Div.
SIGNIFICANCE OF SOLUBILITY DATA IN DETERMINING RATES OF SOLUTION AND DIFFUSION OF STRONTIUM-90 IN THE FORM OF STRONTIUM TITANATE,
by Justin L. Bloom and Cecil O. Riggs. 1962, 38p
RP-62-5-45
Contract AT (30-1)-2220
Distribution: No limitation.

Descriptors: (*Strontium, Solubility), (*Thermoelectricity, Strontium).

Identifiers: Strontium titanate.

TID-21817 **Field 7D**
CFSTI Prices: HC$4.00 MF$1.00
Michigan Univ., Ann Arbor.
COLLISION INDUCED MIXING IN THE FIRST EXCITED STATES OF THE ALKALIES.
Doctoral thesis,
by James Adam Jordan, Jr. 1964, 122p
Contract AT (11-1)-1112
Submitted to Michigan Univ., Ann Arbor. Distribution: No limitation.

Descriptors: (*Alkali metals, Atomic energy levels), (*Atomic energy levels, Electron transitions).

Identifiers: Particle interactions.

TID-21853 **Field 7A, 18J, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Vienna Univ. (Austria). Analytisches Institut.
ION EXCHANGE SEPARATION OF URANIUM AND THORIUM IN NON-AQUEOUS AND MIXED MEDIA.
Progress rept. for Oct 64-Apr 65,
by Johann Korkisch. Apr 65, 34p
Contract AT (30-1)-2623
Distribution: No limitation.

Descriptors: (*Uranium, Ion exchange), (*Thorium, Ion exchange).

TID-7022 (Vol 1-Book 8) **Field 7B, 11F, 18J**
CFSTI Prices: HC$3.50 MF$1.50
National Lead Co. of Ohio, Cincinnati. Analytical Dept.
ANALYTICAL CHEMISTRY MANUAL OF THE FEED MATERIALS PRODUCTION CENTER. SAMPLES FROM SOURCES 6 THROUGH 14 (METAL FABRICATION PLANT THROUGH CO-OP SAMPLES).
Dec 64, 346p
Contract AT (30-1)-1156
Distribution: No limitation.

Descriptors: (*Chemical analysis, Metallurgy), (*Uranium, Metallurgy), (*Metallurgy, Chemical analysis).

TID-7022 (Vol. 1 - Book 4) **Field 7B, 11F, 18J**
CFSTI Prices: HC$3.75 MF$2.00
National Lead Co. of Ohio, Cincinnati. Analytical Dept.
ANALYTICAL CHEMISTRY MANUAL OF THE FEED MATERIALS PRODUCTION CENTER. SAMPLES FROM THE SAMPLING PLANT CANADIAN-DENISON (734) CONCENTRATE THROUGH CANADIAN-PRONTO (712) CONCENTRATE.
Dec 64, 372p
Contract AT (30-1)-1156
Distribution: No limitation.

Descriptors: (*Chemical analysis, Ores (Metal sources)), (*Uranium, Ores (Metal sources)), (*Metallurgy, Chemical analysis).

TID-7022 (Vol. 1-Book 7) **Field 7B, 11F, 18J**
CFSTI Prices: HC$4.50 MF$2.25
National Lead Co. of Ohio, Cincinnati. Analytical Dept.
ANALYTICAL CHEMISTRY MANUAL OF THE FEED MATERIALS PRODUCTION CENTER. SAMPLES FROM SOURCES 2 THROUGH 5 (REFINERY THROUGH METALS REDUCTION PLANT).
Dec 64, 438p
Contract AT (30-1)-1156
Distribution: No limitation.

Descriptors: (*Chemical analysis, Metallurgy), (*Uranium, Metallurgy), (*Metallurgy, Chemical analysis).

TID-7022 - Vol. 1 - Book 3 **Field 7B, 11F, 18J**
CFSTI Prices: HC$3.50 MF$1.75
National Lead Co. of Ohio, Cincinnati. Analytical Dept.
ANALYTICAL CHEMISTRY MANUAL OF THE FEED MATERIALS PRODUCTION CENTER. SAMPLES FROM THE SAMPLING PLANT ALLOY SCRAP (MOLYBDENUM) (627) THROUGH CANADIAN-CAVENDISH CONCENTRATE.
Dec 64, 339p
Contract AT (30-1)-1156
Distribution: No limitation.

Descriptors: (*Chemical analysis, Ores (Metal sources)), (*Uranium, Ores (Metal sources)), (*Metallurgy, Chemical analysis).

TID-7022-Vol. 1-Book 5 **Field 7B, 11F, 18J**
CFSTI Prices: HC$3.75 MF$1.75
National Lead Co. of Ohio, Cincinnati. Analytical Dept.
ANALYTICAL CHEMISTRY MANUAL OF THE FEED MATERIALS PRODUCTION CENTER. SAMPLES FROM THE SAMPLING PLANT CANADIAN-RAYROCK (746) CONCENTRATE THROUGH I. N. X. SUMP LIQUOR.
Dec 64, 364p
Contract AT (30-1)-1156
Distribution: No limitation.

Descriptors: (*Chemical analysis, Ores (Metal samples)), (*Uranium, Ores (Metal samples)), ((*Metallurgy), Chemical analysis).

UCRL-16009 **Field 7E, 7C**
CFSTI Prices: HC$4.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Berkeley.
THE PRODUCTION OF TRITIUM LABELED METHANE AND ETHANE IN THE CH4-T2 SYSTEM.
Doctoral thesis,
by John B. Nash. 12 Apr 65, 114p
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Tritiated compounds, Production), (*Methane, Tritiated compounds).

Identifiers: Ethanes.

WAPD-T-1801 **Field 7D**
CFSTI Prices: HC$6.00 MF$1.25
Pittsburgh Univ, Pa.
SINGULAR PERTURBATIONS OF BOUNDARY VALUE PROBLEMS ARISING IN THE STUDY OF CHEMICAL REACTORS.
Doctoral thesis,
by Louis Barton Freeman. 1965, 218p
Contract AT (11-1)-GEN-14
Distribution: No limitation.

Descriptors: (*Reaction kinetics, Boundary value problems).

WCAP-3269-51 **Field 7B**
CFSTI Prices: HC$2.00 MF$0.50
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
THE CALCULATED pH OF AQUEOUS BORIC ACID SOLUTIONS AS A FUNCTION OF TEMPERATURE AND ADDED BASE CONTENT,
by M. E. Meek. Mar 65, 33p
Contract AT (30-1)-3269
Distribution: No limitation.

Descriptors: (*Boric acids, pH).

Y-1484 **Field 7D, 7E**
CFSTI Prices: HC$1.00 MF$0.50
Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.
THE PREPARATION OF RADIOACTIVE PHOSPHOROUS32 SOURCES ON METAL PLATES,
by W. C. Dietrich and R. E. Barringer. 3 May 65, 14p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Radioactivity isotopes, Phosphorous), (*Phosphorous, Radioactivity isotopes).

8. EARTH SCIENCES AND OCEANOGRAPHY

COO-689-50 **Field 8G**
CFSTI Prices: HC$5.00 MF$1.00
Arizona Univ., Tucson. Geochronology Labs.
CORRELATION AND CHRONOLOGY OF ORE DEPOSITS AND VOLCANIC ROCKS.
Annual progress rept.,
by Paul E. Damon. 1 Aug 65, 157p
Contract AT (11-1)-689
Distribution: No limitation.

Descriptors: (*Economic geology, Geophysical prospecting), (*Geophysical prospecting, Arizona).

ORNL-3827 **Field 8E, 8N**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
ORBITS IN A MAGNETIC UNIVERSE,
by M. A. Melvin and J. S. Wallingford. Jul 65, 14p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Geodesics, Terrestrial magnetism), (*Terrestrial magnetism, Geodesics).

PB-168 483 **Field 8G**
CFSTI Prices: HC$1.00 MF$0.50
National Science Foundation, Washington, D. C.
MOHOLE PROJECT OFFICE, EXCERPT FROM FY 1965 REPORT.
28 Sep 65, 38p
Includes CFSTI RB-3. Distribution: No limitation.

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Marine geology), Bibliographies, Site selection, Geology, Ships, Marine engineering, Abstracts, Pipes, Corrosion, Drilling machines, Oceanography.

Identifiers: Mohole project.

PB-168 573 **Field 8E, 22C**
CFSTI Prices: HC$2.00 MF$0.50
Smithsonian Institution, Cambridge, Mass. Astrophysical Observatory.
DETERMINATION OF THE ABSOLUTE SPACE DIRECTIONS BETWEEN BAKER-NUNN CAMERA STATIONS,
by L. Aardoom, A. Girnius, and G. Veis. 6 Sep 65, 32p Special rept. no. SAO-SR-186
Grant NsG-87-60
Distribution: No limitation.

Descriptors: (*Position finding, Astronomical observatories), (*Satellites (Artificial), Position finding), (*Surveying, Geodesics), Tracking cameras, Direction finding, Mapping, Tracking.

Identifiers: Triangulation.

From quasi-simultaneously observed satellite transits, synthetic simultaneous observations are computed. 615 pairs of such observations are used to determine fixedEarth directions for 14 lines connecting adjacent BakerNunn camera stations. The method is described and the results are given. They indicate that an accuracy in the directions between 0.000002 and 0.000005 (standard deviation) is feasible. With 10 of those directions, a three-dimensional triangulation is performed with 6 of the stations. (Author)

PB-168 640 **Field 8G**
CFSTI Prices: HC$1.00 MF$0.50
Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
PROJECT MOHOLE; A REPORT BIBLIOGRAPHY.
Jun 65, 16p
CFSTI RB-3 canceled
Distribution: No limitation.

Descriptors: (*Bibliographies, Drilling), (*Well logging, Feasibility studies), (*Drilling, Bibliographies), Pipes, Corrosion, Marine geology, Ships, Drilling machines, Oceanography, Site selection, Abstracts, Marine engineering.

Identifiers: Mohole project.

PNE-466 **Field 8A**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Sport Fisheries and Wildlife, Washington, D. C.
SURVEY OF MARINE MAMMALS IN THE CHUKCHI SEA.
Rept. for 29-30 Mar 61.
25 May 61, 10p
Distribution: No limitation.

Descriptors: (*Chukchi Sea, Mammals), (*Mammals, Chuckchi Sea).

RME-4544 (Rev.) **Field 8G**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
RECONNAISSANCE FOR URANIUM IN MATO GROSSO STATE, BRAZIL,
by John W. Gabelman. Dec 63, 22p
Prepared in cooperation with Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro. Distribution: No limitation.

Descriptors: (*Uranium, Brazil).

RME-4571 (Rev.) **Field 8G**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
RECONNAISSANCE FOR URANIUM IN THE COLIMAPU FORMATION OF CENTRAL CHILE,
by William A. Bowes, Paul H. Knowles, Moraga B. Aldo, Klohn H. Erlk, and Serrano C. Marlo. Oct 62, 20p
Prepared in cooperation with the Instituto de Investigaciones Geologicas, Santiago, Chile. Distribution: No limitation.

Descriptors: (*Uranium, Chile).

RME-4584 **Field 8G**
CFSTI Prices: HC$3.00 MF$0.75
Division of Raw Materials (AEC), Washington, D. C.
GEOLOGY OF THE CUZCO-ANTA-URUBAMA AREA, CUZCO DEPARTMENT, PERU,
by John W. Gabelman and Victor Jordan. Jun 64, 100p
Distribution: No limitation.

Descriptors: (*Geology, Peru), (*Peru, Geological survey).

TID-21612 **Field 8G, 8I, 18J**
CFSTI Prices: HC$1.00 MF$0.50
William Marsh Rice Univ., Houston, Tex.
GEOLOGIC ASPECTS OF THORIUM RECOVERY FROM COMMON ROCKS.
Quarterly progress rept. for 1 Sep-30 Nov 64. 1964, 7p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Economic geology, Thorium), (*Thorium, Economic geology).

9. ELECTRONICS AND ELECTRICAL ENGINEERING

AD-294 176 **Field 9A**
CFSTI Price: HC$2.00
General Telephone and Electronics Labs., Inc., Bayside, N. Y.
MICROWAVE TUNNEL DIODE MIXER-AMPLIFIER.
Quarterly progress rept. no. 1, 1 Jun-31 Aug 62,
by W. B. Hauer and H. F. Lockwood. 30 Sep 62, 39p TR-62-151.3
Contract DA-36-039-sc-90692,
Proj. DA-3A99-21-002
Distribution: No limitation.

Descriptors: (*Tunnel diodes, Microwave amplifiers), (*Microwave amplifiers, Tunnel diodes), (*Mixers (Electronics), Tunnel diodes), Demodulators, Theory, Gallium alloys, Antimony alloys, Germanium alloys, Diodes (Semiconductor), Noise (Radio, L band, C band, S band, Mathematical analysis.

The consequences of approximating the normalized tunnel diode characteristic by a second, third, and higher degree polynomial for mixer analyses are investigated. It is shown that simplicity of the approximation is necessary for the observation of trends, and that it can be obtained by restricting the range over which bias and local oscillator amplitude can vary. This restriction rules out analyses involving very large swings (amplitudes larger than the voltage range of the negative region) of the local oscillator voltage across the diode, but appears not to be severe for smaller amplitudes due to symmetrical properties of the tunnel diode characteristic. The results of a graphical analysis of the nonsinusoidal local oscillator voltage across the diode, produced by the nonlinear diode resistance, are described. Under the assumed operating conditions the amplitude of the second harmonic was found to be significant. To study its influence, a considerably extended mixer analysis would be necessary. The relative merits of germanium and gallium antimonide diodes are compared. A choice between the two is premature primarily because it is not precisely known at present what diode parameters are important for efficient low noise mixing. However, a severe limitation with GaSb is that small junctions are very difficult to make.

ANL-7022 **Field 9B**
CFSTI Prices: HC$4.00 MF$0.75
Argonne National Lab., Ill.
COGENT. PROGRAMMING MANUAL,
by John C. Reynolds. Mar 65, 116p
Contract W-31-108-eng-36
Distribution: No limitation.

Descriptors: (*Compilers, Instruction manuals).

Identifiers: COGENT.

GEMP-300 **Field 9A, 18F**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Cincinnati, Ohio. Nuclear Materials and Propulsion Operation.
STATIC SWITCHING PROGRAM.
Final rept.
21 Apr 65, 27p
Contract AT (40-1)-2847
Distribution: No limitation.

Descriptors: (*Switching circuits, Reactor safety systems), (*Reactor safety systems, Switching circuits).

MATT-341 **Field 9A, 20H**
CFSTI Prices: HC$2.00 MF$0.50
Princeton Univ., N. J. Plasma Physics Lab.
A HIGH VOLTAGE RADIO FREQUENCY VARIABLE CAPACITOR USING A LIQUID DIELECTRIC,
by Allan Deitz. Jul 65, 27p CONF-650512-6
Contract AT (30-1)-1238
Presented at Symposium on Engineering Problems of Controlled Thermonuclear Research, Livermore, Calif. Distribution: No limitation.

Descriptors: (*Variable capacitors, Dielectrics), (*Radiofrequency, Variable capacitors).

N65-15383 **Field 9E**
CFSTI Prices: HC$4.00 MF$1.00
Motorola, Inc., Scottsdale, Ariz. Military Electronics Div.
890/960-MC TRANSPONDER, MARK II 100-CYCLE BANDWIDTH.
Final rept.,
by W. Dahl and D. Hummels. 1 Nov 63, 145p FW-2954
Contracts NAS7100, JPL950461
NASA CR-60313
Distribution: No limitation.

Descriptors: (*Transponders, L band).

N65-17073 **Field 9E, 9A**
CFSTI Prices: HC$1.00 MF$0.50
Research Lab. of Electronics. Mass. Inst. of Tech., Cambridge.
RECENT DEVELOPMENTS IN PARAMETRIC MULTIPLIERS,
by R. P. Rafuse. 1963, 10p
Contract NSG-419
NASA CR-52451
Presented at the Natl. Electron. Conf., Chicago, 28-30 Oct 1963. Distribution: No limitation.

Descriptors: (*Parametric amplifiers, Design), Electron multipliers.

Identifiers: Parametric multipliers.

N65-17516 **Field 9B**
CFSTI Prices: HC$6.00 MF$1.25
Nortronics Div., Northrop Corp., Hawthorne, Calif.
INHIBIT - CORE LOGIC STUDY.
Final rept.
Feb 63, 220p Rept. no. NORT-63-45
Contract NAS7 100
NASA CR-60878
Distribution: No limitation.

Descriptors: (*Computer logic, Magnetic cores), (*Magnetic cores, Computer logic).

N65-19763 **Field 9D**
CFSTI Prices: HC$2.00 MF$0.50
Michigan Univ., Ann Arbor.
ON THE MEASUREMENT AND USE OF TIME-VARYING COMMUNICATION CHANNELS,
by William L. Root. 1963, 50p
Grant NsG259
NASA CR-57316
Distribution: No limitation.

Descriptors: (*Information theory, Wave functions), (*Wave functions, Information theory).

N65-21312 **Field 9E**
CFSTI Prices: HC$1.00 MF$0.50
Microwave Electronics Corp., Palo Alto, Calif.
INVESTIGATION OF SOLID-STATE TRAVELINGWAVE AMPLIFIER TECHNIQUES FOR FUTURE SATELLITE APPLICATIONS.
Monthly progress rept. no. 5, 1 Jan-31 Jan 65,
by V. R. Johnson and F. A. Olson. 1965, 6p
Contract NAS5 3972
NASA CR-57796
Microfilmed from best available copy. Distribution: No limitation.

Descriptors: (*Microwave amplifiers, Semiconductor devices), (*Semiconductor devices, Microwave amplifiers).

N65-24868 **Field 9E**
CFSTI Prices: HC$1.00 MF$0.50
TRW Space Technology Labs. Redondo Beach, Calif. Physical Electronics Lab.
A NOVEL HIGH VOLTAGE PULSE GENERATOR,
by J. F. Friichtenicht and D. O. Hanson. 15 Apr 65, 6p STL-4158-6006-TU-000
Contract NASw 936
NASA CR-63137
Distribution: No limitation.

Descriptors: (*Pulse generators, Voltage), Electron tubes, Transistors.

N65-24984 **Field 9C**
CFSTI Prices: HC$4.00 MF$0.75
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
DIGITAL CONTROL OF A SECOND-ORDER LINEAR AFC SYSTEM WITH A LARGE TIME DELAY,
by Robert Boyer. 30 Aug 62, 112p JPL-TM-33-98
Contract NAS7 100
NASA CR-63110
Distribution: No limitation.

Descriptors: (*Control systems, Phase-locked systems), (*Frequency, Control), Digital systems.

N65-26149 **Field 9E**
CFSTI Prices: HC$3.00 MF$0.50
Hughes Aircraft Co., Culver City, Calif. Aerospace Group.
DEVELOPMENT OF DIELECTRIC WINDOWS FOR SPACECRAFT ANTENNAS.
Final rept. 1 Jul 63-30 Jun 64,
by B. G. Kimmel. 1964, 55p P64-70
Contract NAS8 11026
NASA CR-63392
Distribution: No limitation.

Descriptors: (*Antennas, Spacecraft), (*Dielectrics, Antenna components).

N65-27954 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Arizona Univ., Tucson. Engineering Experiment Station.
HYBRID ANALOG-DIGITAL TECHNIQUES AND RANDOM-PROCESS STUDIES, 1964-1965,
by Granmo A. Korn. 1965, 32p EES Ser No 5
Grants NsG 646, AF-AFOSR-89-63
NASA CR-63769
Distribution: No limitation.

Descriptors: (*Analog-to-digital converters, Numerical methods + procedures), (*Stochastic processes, Analogto-digital converters).

Identifiers: Quantization.

N65-33358 **Field 9F, 10B**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
ILLUSTRATION OF DESIGN METHODS FOR POWER REDUCTION IN LOGICAL SYSTEMS,
by H. Allen Curtis. Sep 65, 21p
NASA TND-3027
Distribution: No limitation.

Descriptors: (*Telemeter systems, Power supplies), (*Switching circuits, Telemeter systems), Space communication systems, Design.

Patent 3,207,952 **Field 9E, 17B**
CABLE FADE-IN CIRCUIT.
Patent assigned to Navy,
by Charles B. Brahm. 21 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Switching circuits, Communication equipment), Coupling circuits, Electronic equipment, Patents.

The circuit is for use in communication equipment, switching from one channel to another, substituting one television camera for another and as a fail-safe circuit. The circuit allows large cable signals to build up gradually before they are transferred. The circuit includes an input, a step-up transformer, a coupler switch, two blocking diodes, an RC network, a capacitor, a resistor, a step-down transformer and an output.

Patent 3,209,282 **Field 9A**
TUNNEL DIODE OSCILLATOR.
Patent assigned to Navy,
by Paul Schnitzler. 28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Tunnel diodes, Oscillators), (*Oscillators, Tunnel diodes), Wiring diagrams, Capacitors, Patents.

The tunnel diode oscillator oscillates at only one frequency mode. A tunnel diode is connected in series with a capacitor, which has a larger value of capacitance than the equivalent capacitance of the tunnel diode. The tunnel diode oscillates with an inductor which is placed in parallel with the series combination of tunnel diode and capacitor. The power source is connected across the capacitor.

Patent 3,209,285 **Field 9A**
FOLDED CYLINDER GASEOUS DISCHARGE DEVICE.
Patent assigned to Navy,
by Thomas E. Manwarren and Robert J. Jones. 28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Electronic equipment, Gas discharges), (*Gas discharges, Electronic equipment), Patents, Waveguide switches, High frequency.

The gaseous discharge device may be used in coaxial and waveguide systems. The device is shown employed in a coaxial system and in a waveguide system. The device includes an inner cylinder and a somewhat larger outer cylinder coaxial therewith and spaced therefrom. Both cylinders are closed upon themselves at one end and are joined at their opposite free ends so as to form a sealed enclosed folded cylinder. Both cylinders are made of ceramics or glass. Two ringlike metallic bands or terminals are formed on the outer peripheral surface of the outer cylinder.

Patent 3,209,289 **Field 9A**
MICROWAVE TUNING DEVICE.
Patent assigned to Navy,
by Thomas S. Golden and Paul E. Schmid, Jr. 28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Tuning devices, Microwave equipment), (*Microwave equipment, Tuning devices), Klystrons, Patents.

The cavity of a reflex klystron or other klystron is provided with an external tuning arrangement by which the frequency of operation may be varied in accordance with an externally applied voltage. Various arrangements are shown for coupling an external voltage variable impedance to a resonator cavity so that the resonant frequency of oscillations therein may be controlled and varied according to the magnitude of a bias voltage from a variable source. This arrangement allows frequency sweeps over a fairly wide range of microwave frequencies to be accomplished for the resonator cavity of reflex klystrons or other similar microwave devices.

Patent 3,209,361 **Field 9E**
CASSEGRAINIAN ANTENNA SUBREFLECTOR FLANGE FOR SUPPRESSING GROUND NOISE.
Patent assigned to NASA.
by Philip D. Potter. 28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Parabolic antennas, Radio interference), (*Flanges, Parabolic antennas), Reflectors, Performance (Engineering), Patents, Radio signals, Reflection, Radio transmission.

The antenna may be used for receiving and transmitting. A flange is provided around the edge portion of the subreflector of a Cassegrainian antenna. The flange makes a smaller angle with the plane of the subreflector than does the edge of the major hyperbolically shaped portion of the subreflector. The optional flange size depends on the frequency being used. The flange not only reduces the noise level of received signals, but also improves the efficiency of the antenna when it is used for transmitting.

Patent 3,211,927 **Field 9A**
CIRCUIT OVERLOAD PROTECTOR.
Patent assigned to Navy.
by Harvey J. Klee. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Current limiters, Circuits), Patents, Electronic equipment, Semiconductor devices, Transformers, Rectifiers, Package circuits, Electronic switches, Trigger circuits.

The dynamic microsecond overload and short circuit protector functions rapidly to protect electronic circuits containing solid state electronic components such as transistors. The circuit includes two transformers with pairs of inputs and outputs, a current sensing device, and a silicon controlled rectifier. Current is cut off when it exceeds a predetermined level.

Patent 3,211,947 **Field 9A**
NOISE REDUCTION OF TRAVELING-WAVE TUBES BY CIRCUIT REFRIGERATION.
Patent assigned to Army.
by Stanley Bloom. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Traveling-wave tubes, Noise (Radio), (*Refrigeration systems, Traveling-wave tubes), Cooling, Microwave equipment, Microwave networks.

The traveling wave tube is provided with a cooling jacket along its entire length. The jacket has annular metal discs for the purpose of coupling input and output energy through the jacket. (Author)

Patent 3,212,036 **Field 9E, 13K**
ALL-METAL WAVEGUIDE VACUUM GATE VALVE.
Patent assigned to AEC.
by Knut Skarpaas. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Gate valves, Waveguides), (*Waveguides, Gate valves), Vacuum apparatus, Patents, Radiofrequency.

The in-line radio-frequency waveguide vacuum valve is for use in a radio-frequency waveguide transmission system. The valve is inserted into the waveguide system between lengths of rectangular waveguides. The structure includes a slidable gate assembly including a plate and a gasket associated therewith to form a seal. (Author)

Patent 3,212,037 **Field 9A**
VARIABLE ELECTROMAGNETIC SHORT CIRCUIT.
Patent assigned to Army.
by Lloyd W. Root, Jr. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Delay lines, Circuits), (*Circuits, Delay lines), Patents, Phase shifters, Control systems, Tuning devices, Microwave equipment, Transmission lines, Calibration, Resonators, Electromagnetic waves.

The variable electromagnetic circuit includes a housing with at least one microwave chamber within the housing. The microwave chambers may take the form of a wave guide. Microwave energy is coupled to the chamber. A liquid partially fills the chamber or chambers. Volume blocks in the chambers are adjustable to vary the liquid level to vary the variable circuit.

Patent 3,213,203 **Field 9E, 14C**
DOUBLE INTEGRATOR MAGNETIC AMPLIFIER OUTPUT CIRCUIT.
Patent assigned to Navy.
by William A. Geyher. 19 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Magnetic amplifiers, Integrators), (*Integrators, Circuits), Push-pull amplifiers, Magnetic recording systems, Alternatic current, Patents.

The magnetic amplifier has an integrating circuit adapted to produce a sinusoidal output voltage. Two properly rated integrating circuits are applied to the output of a push-pull magnetic amplifier. An output current may be provided flowing through the excitation winding of a tape recorder head.

Patent 3,213,293 **Field 9E, 9B**
STABLE-LIMITED INPUT CIRCUIT FOR A BISTABLE COMPARATOR.
Patent assigned to Navy.
by Francis P. Finlon and Ralph M. Seeley, Jr. 19 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Comparators, Limiters), (*Analogto-digital converters, Comparators), Amplifiers, Trigger circuits, Voltage, Diodes (Semiconductor), Patents.

The device is for the comparison of two electrical potentials. It is a diode limiter with a sharp voltage break-down characteristic (avalanche type) coupled to a conventional direct current amlifier which is designed to activate a conventional Schmitt trigger circuit. The Schmitt trigger circuit is adapted to give one indication when the input signal is above a certain predetermined set value of potential and a second indication when the input signal is below the set value. Such devices have great utility in analogdigital converters to determine when a voltage wave form has reached a predetermined amplitude.

Patent 3,216,007 **Field 9B**
ANALOG-TO-DIGITAL CONVERSION SYSTEM.
Patent assigned to NASA.
by Louis Mazer. 2 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Analog-to-digital converters, Design), Resolution, Input-output devices, Patents.

The system is concerned with increasing the resolution of analog-to-digital converters. This is accomplished without the requirement of increased disc size or additional discs. Doubling of resolution is attained through employment of step-up gearing or equivalent coupling between the instrument or other analog device and the shaft of the converter such that the converter disc rotates twice for each full scale excursion of revolution of the instrument. A simple switch is employed with the instrument to indicate which half of a revolution the instrument scale is in, or in other words, whether the converter disc has had one or two revolutions for a given digital output count.

PB-168 183 **Field 9B, 5C**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania Research Associates, Inc., Philadelphia.
COMPUTER APPLICATIONS FOR INDUSTRY AND THE MILITARY - A CRITICAL REVIEW OF THE LAST TEN YEARS,
by Donald F. Blumberg. 1963, 12p
Pub. in Spring Joint Computer Conference. Proceedings v23 p179-90 1963. Distribution: No limitation.

Descriptors: (*Computers, Industries), (*Industries, Computers), (*Armed forces (United States), Computers), Data processing systems, United States, Military requirements, United States Government, Commerce, Economics, Costs.

PB-168 426 **Field 9B**
CFSTI Prices: HC$1.00 MF$0.50
Technical Operations Inc., Washington, D. C.
A SYNTAX DIRECTED GENERATOR,
by Stephen Warshall. 1962, 11p
Contract AF33 (600)-41896
Pub. in Proceedings of the Eastern Joint Computer Conference, Washington v20 p295-305 1961. See also AD-277 628. Distribution: No limitation.

Descriptors: (*Compilers, Syntax), Digital computers, Programming languages, Programming (Computers), Control sequences, Analysis.

Phases of compiler translation are divided into (1) syntactic analysis of input strings and (2) synthesis of target-language statements by generators. A complete decoupling of these two phases was effected to permit a complete analysis of arbitrarily large chunks of the input string to antedate any generation. By this system there is analysis of a program up to a syntactic type past the boundaries of which there is no flow of information of interest to the generator. There is analysis up to this type, generation over the result of the analysis, and a return to the analyzer. The analyzer is a short program which utilizes information about the scope and priority of operators--the 'destruction rules' of the language to produce a tree-representation of the input string in which terminal nodes are names (of numbers, functions, etc.) and nonterminal nodes are operators or combiners.

PB-168 583 **Field 9C**
CFSTI Prices: HC$2.00 MF$0.50
SSCO Standards Lab., Inc., Southfield, Mich.
OSCILLOSCOPES 531A - 541A, RM31A - RM41A (TEKTRONIX).
Technical manual instrument calibration, AW-35. 15 Jun 65, 33p
Contract N123 (62861)35059A
NAVWEPS 17-20AW-35
Distribution: No limitation.

Descriptors: (*Oscilloscopes, Calibration), (*Test equipment (Electronics), Oscilloscopes), Laboratory equipment, Instruction manuals, Test methods.

The manual describes the calibration procedure for the Tektronix 531A, 541A, RM31A, and RM41A oscilloscopes, which are broadband laboratory instruments with calibrated sweeps, sweep magnification, an amperature calibrator, provisions for automatic or adjustable triggering from either internal or external sources, and the necessary power supplies.

RME-143 **Field 9B, 18B, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Grand Junction Office (AEC), Colo. Production Evaluation Div.
THE GAMLOG COMPUTER PROGRAM,
by James H. Scott. Sep 62, 46p
Distribution: No limitation.

Descriptors: (*Programming (Computers), Mining engineering), (*Ores (Metal sources), Uranium).

TID-21938 **Field 9B**
CFSTI Prices: HC$3.00 MF$1.00
Tennessee Univ., Knoxville. Dept. of Electrical Engineering.
A STUDY OF THREE ANALOG-TO-DIGITAL CONVERSION TECHNIQUES.
Scientific rept no. 17,
by E. K. Reedy. 15 Dec 64, 97p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Analog-to-digital converters, Operation).

TID-21939 **Field 9A, 20L**
CFSTI Prices: HC$3.00 MF$0.75
Tennessee Univ., Knoxville. Dept. of Electrical Engineering.
AN EXPERIMENTAL STUDY OF NOISE IN SILICON PLANAR TRANSISTORS.
Scientific rept. no. 6,
by A. S. Sabin, T. V. Blalock, and J. F. Pierce. 20 Mar 63, 65p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Transistors, Noise), (*Silicon, Transistors).

TID-22019 **Field 9E, 18D**
CFSTI Prices: HC$3.00 MF$0.75
Tennessee Univ., Knoxville. Dept. of Electrical Engineering.
AN EVALUATION OF A FAST COMPLEMENTARY, HYBRID BISTABLE MULTIVIBRATOR,
by T. O. Barnett and J. F. Pierce. 15 Apr 65, 63p
Scientific rept. no. 18
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Relaxation oscillators, Tests).

UCRL-14141 **Field 9A**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
SECTORIAL PARALLEL PLATE TRANSMISSION LINE,
by Robert E. Kelly. Sep 64, 30p
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Transmission lines, Mathematical analysis).

UCRL-7753 **Field 9E**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
HIGH-SPEED MICROWAVE PHASE SHIFTERS USING VARACTOR DIODES,
by A. L. Gardner and Ronald S. Hawke. 24 Jul 64, 15p
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Phase shifters, Microwave equipment), (*Varactor diodes, Phase shifters).

10. ENERGY CONVERSION (NON-PROPULSIVE)

BNL-9329 **Field 10B, 18N**
CFSTI Prices: HC$2.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
STUDIES OF A REPETITIVE LIQUID METAL SLUG MHD GENERATOR,
by J. R. Powell, M. S. Zucker, J. P. Palmer, and W. W. Becker. Jun 65, 42p CONF-650541-1
Contract AT-30-2-GEN-16
Presented at American Society of Mechanical Engineers, International Conference on Energetics, Gatlinburg, Tenn. Distribution: No limitation.

Descriptors: (*Magnetohydrodynamic generators, Liquid metals).

N65-17885 **Field 10C**
CFSTI Prices: HC$3.00 MF$0.50
Electric Storage Battery Co., Raleigh, N. C. Missile Battery Div.
RESEARCH AND DEVELOPMENT ON CELLS WITH BELLOWS CONTROLLED ELECTROLYTE LEVELS.
Quarterly rept. no. 2 for 10 Sep-10 Dec 64.
10 Dec 64, 52p Rept. no. ESB-E-3-65
Contract NAS5 3813
NASA CR-60932
Distribution: No limitation.

Descriptors: (*Alkaline cells, Electrolytes), (*Electrolytes, Control systems).

N65-17948 **Field 10C**
CFSTI Prices: HC$4.00 MF$0.75
Naval Ammunition Depot, Crane, Ind.
SPACE CELL TEST PROGRAM; LIFE CYCLE TESTS.
Monthly progress rept. 31 Jan 65.
17 Feb 65, 112p
NASA CR-60964

Distribution: No limitation.

Descriptors: (*Alkaline cells, Life expectancy).

Identifiers: Nickel-cadmium cells, Silver-cadmium cells, Silver-zinc cells.

N65-17952 **Field 10B, 10A**
CFSTI Prices: HC$4.00 MF$1.00
Marquardt Corp., Van Nuys, Calif.
STUDY OF BIOCHEMICAL FUEL CELLS.
Final rept. 19 Mar 63-19 Sep 64,
by G. E. Ellis. 1964, 123p Rept. no. 25144
Contract NASW654
NASA CR-60978
Distribution: No limitation.

Descriptors: (*Fuel cells, Biochemistry).

Identifiers: Biochemical fuel cells.

N65-19754 **Field 10C**
CFSTI Prices: HC$1.00 MF$0.50
General Electric Co., Schenectady, N. Y. Advanced Technology Labs.
STUDY OF USE OF AUXILIARY ELECTRODES IN SILVER CELLS.
Quarterly rept. no. 9, 1 Aug-1 Nov 64.
1 Nov 46, 21p
Contract NAS5 3669
NASA CR-57262
Distribution: No limitation.

Descriptors: (*Electrodes, Primary cells), (*Silver, Primary cells), (*Storage batteries, Electrodes).

N65-19755 **Field 10A, 22B, 18H**
CFSTI Prices: HC$4.00 MF$0.75
Exotech, Inc., Alexandria, Va.
HANDBOOK ON SPACE RADIATION EFFECTS TO SOLAR CELL POWER SYSTEMS,
by William C. Cooley, Robert J. Janda, andKandiah Shivanandan. 22 Jul 63, 117p
Contract NASw598
NASA CR-57267
Microfilmed from best available copy. Distribution: No limitation.

Descriptors: (*Solar cells, Radiation damage), (*Electric power production, Solar cells).

N65-24922 **Field 10A, 10B**
CFSTI Prices: HC$3.00 MF$0.75
Ryan Aeronautical Co., San Diego, Calif.
THE DEVELOPMENT OF DEPLOYABLE SOLAR ARRAYS. PHASE I.
Summary rept.,
by A. C. Maier and B. Lake. 15 Oct 64, 96p
Rept. no. 64B119
Contract NAS53987
NASA CR-62978
Distribution: No limitation.

Descriptors: (*Solar cells, Configuration).

N65-24986 **Field 10C, 22B**
CFSTI Prices: HC$4.00 MF$0.75
Naval Ammunition Depot, Crane, Ind.
MONTHLY PROGRESS REPORT ON NATIONAL AERONAUTICS AND SPACE ADMINISTRATION SPACE CELL TEST PROGRAM.
Progress rept. as of 30 Nov 64,
by E. R. Pettebone. 16 Dec 64, 109p
NASA CR-63095
Distribution: No limitation.

Descriptors: (*Batteries + Components, Spacecraft), (*Spacecraft, Batteries + components).

N65-26408 **Field 10C**
CFSTI Prices: HC$6.00 MF$1.25
Quality Evaluation Lab., Naval Ammunition Depot, Crane, Ind.
EVALUATION PROGRAM FOR SECONDARY SPACECRAFT CELLS. CYCLE LIFE TEST.
Annual rept. no. 1.
14 May 65, 205p Rept. no. QE/C-65-356
Contract Wll.252B
NASA CR-63424
Distribution: No limitation.

Descriptors: (*Alkaline cells, Spacecraft), (*Storage batteries, Life expectancy).

N65-33548 **Field 10A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
CALORIMETRIC EVALUATION OF A 60-INCH (152CENTIMETER) ELECTROFORMED NICKEL SOLAR CONCENTRATOR,
by Conrad M. Willis. Sep 65, 26p
NASA TND-3012
Distribution: No limitation.

Descriptors: (*Solar radiation, Thermionic converters), (*Thermionic converters, Solar radiation).

NYO-3429-3 **Field 10A**
CFSTI Prices: HC$2.00 MF$0.50
Radio Corp. of America, Lancaster, Pa. Direct Energy Conversion Dept.
THE DEVELOPMENT OF AN IMPROVED THERMIONIC ENERGY CONVERTER.

Quarterly technical rept. no. 3,
Apr 65, 32p
Contract AT (30-1)-3429
Distribution: No limitation.

Descriptors: (*Thermionic converters, Cesium), (*Cesium, Thermionic converters).

Patent 3,208,879 **Field 10C**
ELECTRIC STORAGE DEVICE.
Patent assigned to Army,
by Laurence P. McGinnis and William J. Pauli. 28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Storage batteries, Guided missile warheads), Patents.

The battery has unlimited storage life. It may be used as a power source for large missile war heads. It is activated by a short-duration high-current electric pulse. The battery has a pair of silver electrodes, a zinc chloride electrolyte and a hermetically sealed container.

Patent 3,211,588 **Field 10C, 19A**
DEFERRED ACTION BATTERY.
Patent assigned to Navy,
by Paul Marsal. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Storage batteries, Projectiles), Patents, Wet cells, Power supplies, Electrolytes, Operation.

PB-167 611 **Field 10A, 11I, 7D**
CFSTI Prices: HC$4.00 MF$0.75
Gregor (H. P.) Leonia, N. J.
ION EXCHANGE MEMBRANE ELECTROLYTES.
Final rept. for 1 Mar 62-31 Aug 63,
by H. P. Gregor, R. A. Cooper, R. M. Danziger, and G. Brandrup. 31 Aug 63, 113p Rept. no. 6
Contract DA36-039-sc-89197,
Task 1G6-22001-A-053-04
AD 434 245
See also AD-418 246. Distribution: No limitation.

Descriptors: (*Fuel cells, Ion exchange resins), (*Ion exchange resins, Synthesis (Chemistry)), (*Membranes, Preparation), Semipermeability, Osmosis, Electrical properties, Water, Mass transfer, Epoxy plastics, Sulfonic acids, Phenolic resins, Resistance (Electrical), Electrochemistry, Probes (Electromagnetic), Electrolytes.

Cationic ion-exchange membranes having low ohmic resistance and low electro-osmotic water transport (particularly with the mosaic membrane types) were prepared and evaluated by a number of characterization techniques, including performance in a fuel cell apparatus. New methods were developed for the more accurate measurement of resistance, concentration potential and electro-osmotic flow of low resistance membranes designed for fuel cell use. (Author)

11. MATERIALS

AD-266 290 **Field 11K**
CFSTI Price: HC$2.00
Coating and Chemical Lab., Aberdeen Proving Ground, Md.
REPORT ON REVISION OF MILITARY SPECIFICATION MIL-S-11090A, SOLVENT, DEGREASING SELFEMULSIFYING,
by R. Wagner. 30 Sep 61, 30p Rept. no. CCL-110
Proj. DA-593-32-006
Distribution: No limitation.

Descriptors: (*Organic solvents, Specifications), Greases, Cleaning compounds, Colloids.

The comparison formula was changed to enable procurement of a cleaner capable of removing MIL-G-10924 grease without loss of the heavy duty cleaning characteristics of the previous standard comparison formula of MIL-S-11090A. New test methods were developed to insure procurement of cleaners having the properties obtainable. (Author)

AD-466 520 **Field 11I, 11D**
CFSTI Prices: HC$1.00 MF$0.50
Forest Products Lab., Madison, Wis.
FATIGUE STRENGTH OF PLASTIC LAMINATES REINFORCED WITH UNWOVEN 'S' GLASS FIBERS.
Final rept.,
by Kenneth H. Boller. May 65, 25p
Contract AF33 657 63 358,
Proj. 7381,
Task 738103
ML TR-64-403
Distribution: No limitation.

Descriptors: (*Composite materials, Laminated plastics), (*Laminated plastics, Fatigue (Mechanics)), (*Glass textiles, Reinforcing materials), Epoxy plastics, Filaments, Glass.

Fatigue curves are presented for plastic laminates reinforced with layers of unwoven 'S' glass filaments in a matrix of epoxy-type resin and subjected to various alternating stress amplitudes superimposed on constant mean loads of 0 and 25,000 pounds per square inch tensile stress. The S-N curves were determined by axially loading specimens of three types of construction, namely: (1) all layers of unwoven glass parallel to the principal axis, (2) alternate layers at ± degrees to the principal axis, and (3) alternate layers at 0 and 90 degrees to the principal axis. All experiments were conducted on unnotched specimens, at 900 cycles per minute, in an atmosphere maintained at 73F. and 50 percent relative humidity. Loads were applied parallel to the principal axis. The S-N curves and replication of specimens establishing the curves show that the fatigue strength of 'S' glass laminates is significantly greater than that of similar 'E' glass laminates. (Author)

ANL-6955 **Field 11F, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
DEVELOPMENT OF A PROCESS FOR MANUFACTURING ZPR-III U-PU-MO TEST FUEL ELEMENTS,
by A. B. Shuck, E. M. Pilarski, A. G. Hins, and G. Burton, Jr. Mar 65, 41p
Contract W-31-109-eng-38
Distribution: No limitation.

Descriptors: (*Reactor fuel elements, Uranium alloys), (*Uranium alloys, Reactor fuel elements), Plutonium alloys, Molybdenum alloys.

BMI-1735 **Field 11B, 11F, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
CHARACTERIZATION OF PYROLYTIC-CARBON FUELPARTICLE COATINGS PREPARED WITH ACETYLENE,
by Melvin F. Browning, Dale A. Vaughan, Joseph F. Dettore, and John M. Blocher, Jr. 19 Jul 65, 43p
Contract W-7405-eng-92
Distribution: No limitation.

Descriptors: (*Reactor fuels, Ceramic coatings), (*Ceramic coatings, Carbon), (*Alkynes, Pyrolysis), Fluidized bed processes.

BNWL-83 **Field 11F, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
CORROSION IN SIMULATED PRTR FUEL ELEMENT SURFACE CREVICES,
by W. K. Winegardner. Jul 65, 28p
Contract AT (45-1)-1830
Distribution: No limitation.

Descriptors: (*Reactor fuel elements, Corrosion), (*Corrosion, Reactor fuel elements).

DP-964 **Field 11F, 18I, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Du Pont De Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
CORROSION OF EQUIPMENT IN THE HEAVY WATER COMPONENTS TEST REACTOR,
by J. Malvyn McKibben. Jun 65, 20p
Contract AT (07-2)-1
Distribution: No limitation.

Descriptors: (*Corrosion, Reactor system components), (*Heavy water reactors, Corrosion).

EURAEC-1403 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Centre National de La Recherche Scientifique, Paris (France).
MECHANICAL PROPERTIES OF STEELS.
Final rept. no. 1,
by G. Chaudron. 1965, 33p EUR-2362
Contract 085-62-7-RDF,
Proj. 293
Distribution: No limitation.

Descriptors: (*Steel, Mechanical properties).

GA-5033 **Field 11B**
CFSTI Prices: HC$4.00 MF$0.75
General Atomic, San Diego, Calif. John J. Hopkins Lab. for Pure and Applied Science.
RESEARCH ON GRAPHITE.
Annual rept. for 1 Apr 63- 31 Mar 64,
by R. J. Price and J. L. White. Mar 65, 102p
Contract AT (04-3)-167
Distribution: No limitation.

Descriptors: (*Graphite, Microstructure).

GEAP-4751 **Field 11F, 18J**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., San Jose, Calif. Atomic power Equipment Dept.
MICROSTRUCTURAL EVALUATION OF SUPERHEAT CLADDING MATERIALS,
by F. A. Comprelli, and J. E. Lewis. Jan 65, 61p

Contract AT (04-3)-189
Distribution: No limitation.

Descriptors: (*Reactor fuel cladding, Microstructure).

GEAP-4760 **Field 11F, 18J**
CFSTI Prices: HC$4.00 MF$0.75
General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
GENERAL CORROSION OF MATERIALS FOR NUCLEAR SUPERHEAT APPLICATIONS,
by W. L. Pearl, E. G. Brush, G. G. Gaul, and G. P. Wozadlo. Mar 65, 123p
Contract AT (04-3)-189
Distribution: No limitation.

Descriptors: (*Corrosion, Reactor materials), (*Reactor materials, Corrosion).

GEMP-375 **Field 11F, 11B**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Cincinnati, Ohio. Nuclear Materials and Propulsion Operation.
PROPERTIES OF SOME REFRACTORY METALS. III. THERMAL EXPANSION CHARACTERISTICS OF TUNGSTEN, RHENIUM TANTALUM, MOLYBDENUM, NIOBIUM, W-25RE, TAIOW, AND MO-5ORE,

by J. B. Conway. 29 Jun 65, 33p
Contract AT (40-1)-2847
Distribution: No limitation.

Descriptors: (*Refractory metals, Thermal expansion), (*Refractory metal alloys, Thermal expansion).

GEMP-47A **Field 11F, 18J**
CFSTI Prices: HC$4.00 MF$0.75
General Electric Co., Cincinnati, Ohio. Nuclear Materials and Propulsion Operation.
HIGH-TEMPERATURE MATERIALS PROGRAM.
Progress rept. no. 47, pt. A.
28 May 65, 108p
Contract AT (40-1)-2847
Distribution: No limitation.

Descriptors: (*Reactor fuel cladding, Antioxidants), (*Reactor materials, Heat-resistant metals + alloys). (*Heat-resistant metals + alloys, Radiation damage).

IS-1195 **Field 11F**
CFSTI Prices: HC$3.00 MF$0.50
Iowa State Univ. of Science and Technology, Ames. Inst. for Atomic Research.
THE APPLICATION OF VACUUM METALLURGY IN THE PURIFICATION OF RARE-EARTH METALS,
by Karl A. Gschneidner, Jr. 10 Aug 65, 53p
CONF-650617-3
Contract W-7405-eng-42
Presented at Annual Conference on Vacuum Metallurgy (8th), New York, N. Y. 21-3 Jun 1965.
Distribution: No limitation.

Descriptors: (*Refining (Metallurgy), Rare earth elements), (*Rare earth elements, Purification), Vacuum.

LA-DC-6956 **Field 11F, 18J, 20M**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
DENSITIES OF SOME LOW MELTING PLUTONIUM ALLOYS,
by Ralph H. Perkins, Louis A. Geoffrion, and John C. Biery. 1964, 22p CONF-650704-8, SM-66/73
Contract W-7405-eng-36
Presented at the IAEA Symposium on Thermodynamics, Vienna. Distribution: No limitation.

Descriptors: (*Plutonium alloys, Density), (*Reactor fuels, Plutonium alloys).

LA-DC-6957 **Field 11F, 18J, 20M**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
SELF-DIFFUSION STUDIES OF GAMMA PLUTONIUM,
by Raymond E. Tate and Glen R. Edwards. 1964, 16p CONF-650704-4, SM-66/65
Contract W-7405-eng-36
Presented at the IAEA Symposium on Thermodynamics, Vienna. Distribution: No limitation.

Descriptors: (*Plutonium, Diffusion), (*Phase studies, Plutonium).

N65-15535 **Field 11C**
CFSTI Price: MF$1.50
Denver Research Inst., Colo.
NASA CONTRIBUTIONS TO THE TECHNOLOGY OF INORGANIC COATING,
by J. D. Plunkett. 1964, 263p
NASA SP-5014
Hardcopy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $1.00.
Distribution: No limitation.

Descriptors: (*Coatings, Reviews), (*Protective treatments, Spacecraft).

N65-18933 **Field 11B, 11F**
CFSTI Prices: HC$5.00 MF$1.00
IIT Research Inst., Chicago, Ill. Technology Center.
HIGH-TEMPERATURE ELECTRICAL PROPERTIES OF INSULATORS AND THEIR COMPATIBILITY WITH REFRACTORY METALS.
Summary rept.,
by Richard F. Havell and Frederick C. Holtz. 3 Mar 65, 169p IITRI-B6016-17
Contract NAS34104
NASA CR-54125
Distribution: No limitation.

Descriptors: (*Ceramic materials, Electric insulation), (*Electric insulation, Ceramic materials), High temperature research, Refractory metals.

N65-20751 **Field 11G**
CFSTI Prices: HC$1.00 MF$0.50
National Beryllis Corp., Haskell, N. J.
RESEARCH ON LOW DENSITY THERMAL INSULATION MATERIALS FOR USE ABOVE 3000F.
Quarterly Status Report No. 4; Oct 1-Dec 31, 1964,
by Karsten H. Styhr. 1964, 16p
Contract NASw884
NASA CR-57727
Distribution: No limitation.

Descriptors: (*Thermal insulation, Foams), (*Zirconium compounds, Oxides), (*Reinforcing materials, Fibers).

N65-21344 **Field 11F**
CFSTI Prices: HC$3.00 MF$0.75
Materials Research Lab., Inc., Richton Park, Ill.
ELEVATED TEMPERATURE STRESS CORROSION OF HIGH STRENGTH SHEET MATERIALS IN THE PRESENCE OF STRESS CONCENTRATORS.
Interim rept. no. 1,
by R. L. Kirchner and E. J. Ripling. Nov 64, 98p

Contract NASr50
NASA CR-57914
Distribution: No limitation.

Descriptors: (*Stress corrosion, Sheets), (*Titanium alloys, Stress corrosion), (*Stainless steel, Stress corrosion), (*Nickel alloys, Stress corrosion).

N65-24950 **Field 11F, 11I, 11B**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
1964 PUBLICATIONS.
30 Jan 65, 22p Rept. no. TMX-53191
Distribution: No limitation.

Descriptors: (*Reports, Materials), (*Materials, Reports), Bibliographies, Abstracting, Aeronautics.

N65-27394 **Field 11F**
CFSTI Prices: HC$3.00 MF$0.75
Thompson Ramo Wooldridge, Inc., Cleveland, Ohio.
OPERATION OF A FORCED CIRCULATION, HAYNES ALLOY NO. 25, MERCURY LOOP TO STUDY CORROSION PRODUCT SEPARATION TECHNIQUES.
Rept. for May 62-Apr 64 on the Sunflower program,
by David B. Cooper. Jul 65, 68p Rept. no. ER-5985
Contract NAS5 462
NASA CR-241
Distribution: No limitation.

Descriptors: (*Cobalt alloy, Corrosion), (*Corrosion, Cobalt alloys), (*Mercury, Corrosive liquids), Chromium alloys, Tungsten alloys, Nickel alloys.

Identifiers: Haynes alloy 25.

N65-27515 **Field 11C, 11F, 21H**
CFSTI Prices: HC$1.00 MF$0.50
IIT Research Inst., Chicago, Ill. Technology Center.
PROTECTIVE COATING FOR REFRACTORY METALS IN ROCKET ENGINES.
Supplemental rept., 8 Mar 63-15 Mar 64.
18 Mar 65, 19p IITRI-B237-25
Contract NAS7113
NASA CR-63661
Distribution: No limitation.

Descriptors: (*Refractory metals, Coatings), (*Rocket motor nozzles, Coatings), (*Coatings, Refractory metals).

N65-29952 **Field 11F**
CFSTI Prices: MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
TECHNICAL AND ECONOMIC STATUS OF MAGNESIUM-LITHIUM ALLOYS,
by Paul D. Frost. Aug 65, 51p
NASA SP-5028
Hardcopy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.25.
Distribution: No limitation.

Descriptors: (*Magnesium alloys, Lithium alloys), Economics.

N65-32398 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EFFECT OF VARIATIONS IN SILICON AND IRON CONTENT ON EMBRITTLEMENT OF A COBALT-BASE ALLOY (L-605),
by Gary D. Sandrock, Richard L. Ashbrook, and John C. Freche. Sep 65, 25p
NASA TND-2989
Distribution: No limitation.

Descriptors: (*Cobalt alloys, Brittleness), (*Brittleness, Cobalt alloys), Silicon alloys, Iron alloys.

NAA-SR-10462 **Field 11F, 18J, 18L, 18N**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
PERMEATION OF HYDROGEN THROUGH METALS,
by R. W. Webb. 25 Jul 65, 29p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Metals, Permability), (*Hydrogen, Diffusion), (*Reactor materials, Permability).

Identifiers: SNAP.

NAA-SR-10768 **Field 11B, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
NONEQUILIBRIUM URANIUM CARBIDE PHASE RELATIONSHIPS,
by E. E. Ritchie. 1 Sep 65, 27p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Phase studies, Reactor fuels), (*Uranium compounds, Carbides), Microstructure.

NAA-SR-11121 **Field 11F, 18J, 18H, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.

URANIUM-10 WT PERCENT MO FUEL ELEMENT IRRADIATION IN SRE,
by J. L. Arnold, K. J. Miller, and R. M. Peterson.
31 Aug 65, 34p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Reactor fuel elements, Radiation damage), (*Uranium alloys, Molybdenum alloys).

Identifiers: Uranium alloy 10 Mo.

NAA-SR-11323 **Field 11F, 18I, 18J**
CFSTI Prices: HC$3.00 MF$0.50
Atomics International, Canoga Park, Calif.
STUDY OF INSTANTANEOUS COLLAPSE AND CREEP BUCKLING CHARACTERISTICS OF LARGE SGR PROCESS TUBES,
by M. Lemcoe. 26 Jul 65, 47p
Contract AT-11-1-GEN-8
Distribution: No limitation.

Descriptors: (*Pipes, Deformation), (*Sodium-graphite reactors, Pipes), Creep, Buckling (Mechanics).

NMI-1263 **Field 11F, 13H**
CFSTI Prices: HC$3.00 MF$0.75
Nuclear Metals, West Concord, Mass.
FUNDAMENTAL AND APPLIED RESEARCH AND DEVELOPMENT IN METALLURGY. DEVELOPMENT OF ZIRCONIUM-BASE ALLOYS STRENGTHENED BY SLIS TECHNIQUES.
Summary technical rept. for 1 Jul 63-30 Jun 64,
by A. R. Kaufmann and W. C. Muller. 15 Jan 65, 58p
Contract AT (30-1)-2784
Distribution: No limitation.

Descriptors: (*Zirconium alloys, Dispersion hardening), (*Dispersion hardening, Zirconium alloys), Beryllium alloys, Tin alloys.

Identifiers: Zircoloy-2.

NNES-IV-12A **Field 11F**
CFSTI Prices: HC$5.00 MF$1.25
Atomic Energy Commission, Washington, D. C.
METALLURGY OF URANIUM AND ITS ALLOYS,
ed. by J. C. Warner. 1953, 200p
Distribution: No limitation.

Descriptors: (*Uranium, Metallurgy), (*Metallurgy, Uranium), Uranium alloys.

NUMEC-2389-6 **Field 11F, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Nuclear Materials and Equipment Corp., Apollo, Pa. Plutonium Lab.
SINTERING BEHAVIOR OF PLUTONIUM DIOXIDE,
by M. D. Houston. 1964, 24p
Contract AT (30-1)-2389
Distribution: No limitation.

Descriptors: (*Plutonium compounds, Sintering), Oxides.

NYO-3363-2 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.75
Mechanical Technology Inc., Latham, N. Y.
A THEORY FOR TURBULENT FLUID FILMS AND ITS APPLICATION TO BEARINGS.
Technical rept.,
by H. G. Elrod, Jr., C. W. Ng, and C. H. T. Pan.
Mar 65, 73p MTI-65TR9
Contract AT (30-1)-3363
Distribution: No limitation.

Descriptors: (*Lubricants, Bearings), (*Bearings, Lubrication).

Patent 3,208,107 **Field 11E, 13I**
FIBER BLENDER.
Patent assigned to Agriculture.
by James I. Kotter, Eugene F. Wallace, Harold L. Salaun, Jr. and Ralph A. Rusca. 28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Fibers (Natural), Processing), CoHon, Woolen textiles, Fibers (Synthetic), Machines, Patents.

The machine is for use in opening and blending fibers directly from baled lint cotton. It may be used in the processing of synthetic fibers, wool, ramie, jute, and flax. Cotton from a large number of bales can be blended by use of a single machine. The apparatus includes structure for handling a composite sandwich bale. A reciprocating head assembly includes fiber processing cylinders, each provided with a plurality of peripheral teeth.

Patent 3,208,848 **Field 11B**
ALUMINA-COBALT-GOLD COMPOSITION.
Patent assigned to AEC.
by Ralph P. Levey, Jr. 28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Cermets, Cutting tools), (*Aluminum compounds, Cermets), Oxides, Cobalt, Gold, Powders, Sintering, Pressure, Patents.

The composition has excellent high pressure-high temperature properties. It may be used for making tool tips. The composition contains 80 to 97 percent alumina and 3 to 20 percent of a mixture of cobalt and gold.

Patent 3,210,273 **Field 11H, 11I**
ORGANIC LIQUIDS THICKENED WITH ORGANOSILICA AEROGELS.
Patent assigned to Monsanto Company.
by Thomas A. Taulli. 5 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Greases, Viscosity), (*Lubricant additives, Siloxanes), (*Siloxanes, Lubricant additives), (*Plastics, Additives), Organic materials, Liquids, Gels, Silicon compounds, Polymers, Vinyl plastics, Silicone plastics, Polyester plastics, Plasticizers, Halocarbon plastics, Alkenes, Oils, Patents.

An organo-silica aerogel containing from 0.4 to 1.2 percent by weight of carbon and from 0.9 to 1.5 percent of hydrogen is utilized as a thickener for hydrocarbon greases. The composition, a silica polymer having a silicon dioxide to carbon atom ratio ranging from 10:1 to 50:1 and a silicon dioxide to hydrogen ratio varying from 0.77:1 to 2:1, is derived from an acidic silicacontaining alcohol, ketone, or ester and water. From 1 to 9 percent by weight of the organic liquid is silica. It is converted to an aerogel at temperatures from 90 to 750 degrees C. The additive thickens oils having viscosities between 100 and 600 centipoises at 25 degrees C. to viscosities of from 1,000 to 8,000 centipoises at 25 degrees C. The invention also relates to plastisols and resins thickened and/or made thixotropic by the incorporation therein of such aerogels.

Patent 3,210,274 **Field 11H**
PROCESS FOR PREPARATION OF OLEOPHILIC CLAY POWDER THICKENED FLUIDS.
Patent assigned to Shell Oil Company, New York, N. Y.
by Gerard P. Caruso. 5 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Lubricant additives, Clay), (*Clay, Lubricant additives), (*Greses, Lubricant additives), Viscosity, Moistureproofing, Colloids, Phosphoric acids, Fatty acids, Amides, Amines, Alkenes, Patents.

An amidoamine-modified benetonite clay thickener for mineral lubricating oils imparts water-proofing characteristics. A purified clay hydrosol containing from 1 to 5 percent of clay is acidified with from 4 to 12 percent by weight of clay of phosphoric acid. The amidoamine compound is a reaction product of polyalkylene polyamines and fatty acids having from 10 to 18 carbon atoms per molecule. Desirable results are obtained with ethylene diamine and tall oil or coconut oil acids. From 50 to 75 percent by weight of clay of the amine composition is employed, and the mixture is then spray dried to a water content of from 2.5 to 7.5 percent. The clay is dispersed in an oil medium and homogenized at a temperature of 280 degrees F. to further reduce the amount of water to from 0.02 to 0.5 percent by weight.

Patent 3,210,275 **Field 11H**
LUBRICATING COMPOSITION CONTAINING METAL SALTS OF HINDERED PHOSPHORODITHIOATES.
Patent assigned to Continental Oil Company, Ponca City, Okla.
by Albert M. Durr, Jr. 5 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Lubricant additives, Organic phosphorus compounds), (*Organic phosphorus compounds, Lubricant additives), (*Organic sulfur compounds, Lubricant additives), Antioxidants, Stabilization, Zinc compounds, Salts, Patents.

Identifiers: Phosphorodithioates, Zinc phosphorodithioates.

A zinc phosphorodithioate compound is a thermally stable oxidation inhibitor for automotive engine lubricating oil. Primary alcohols such as monosubstituted methanols are reacted with phosphorus pentasulfide in a ratio of four mols of alcohol to one mol of sulfide to form a secondary phosphorodithioic acid ester, which is converted to a metal salt. The metals include barium, lead, calcium, strontium, and nickel. Methyl amyl alcohol or 2,2-dimethyl-1-propanol is combined with the sulfide and zinc oxide, and an amount sufficient to impart a phosphorus content of from 0.01 to 0.25 percent by weight is added to a mineral or synthetic oil having a viscosity ranging from 75 to 400 SUS at 100 degrees F.

Patent 3,210,276 **Field 11H**
LUBRICANT COMPOSITIONS.
Patent assigned to Standard Oil Company, Chicago, Ill.
by Edwin L. De Young and Roger W. Watson. 5 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Lubricant additives, Silicon compounds); (*Silicon compounds, Lubricant additives), Fatty acids, Sulfur compounds, Terpenes, Bearings, Silver, Wear resistance, Patents.

Identifiers: Anti-wear agents.

A silicon-containing composition functions as an anti-wear additive for mineral or synthetic lubricating oils containing sulfurized oxidation and corrosion inhibitors. Fatty acids such as caproic, stearic, myristic, or isobutyric acids are reacted with silicon tetrachloride or silicon disulfide to provide a compound having four alkyl radicals of up to 19 carbon atoms each. From 0.05 to 3 percent by weight of the silicon additive is employed in lubricants to reduce the wear in silver bearings and bushings caused by elemental sulfur.

Patent 3,210,277 **Field 11H**
STABILISATION OF CHLORINATED HYDROCARBONS.
Patent assigned to Chemical Industries Limited, London, England.
by George Edward Swift. 5 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Halogenated hydrocarbons, Stabilization), (*Lubricant additives, Halogenated hydrocarbon), (*Chlorine compounds, Lubricant additives), Phenols, Salts, Barium compounds, Calcium compounds, Magnesium compounds, Complex compounds, Fatty acid esters, Phosphites, Sulfides, Alcohols, Pressure, Patents.

Identifiers: Barium octyl phenol sulfide, Pentaerythritol dioleates, Phenates, Pressure-resistant agents, Sequestering agents.

Gear lubricants containing chlorinated extreme pressure additives are stabilized by incorporating minor amounts of a calcium, barium, or magnesium alkyl phenate and a sequestering agent. The extreme pressure agent is a paraffin having from 8 to 26 carbon atoms per molecule, and a chlorine content ranging from 25 to 70 weight percent. The phenates contain two hydrogen atoms and two alkyl groups of from 1 to 10 carbon atoms each, or four alkyl radicals. They may also have sulfur or dithio linkages. The sequestering agent is a pentaerythritol ester of a long chain fatty acid or an alkyl or aryl phosphite, present in amounts ranging from 0.1 to 5 percent by weight or chlorinated paraffin. Similar amounts of barium alkyl phenate are used. The additives prevent the staining of metal surfaces by gear oils, and oils for metal cutting and drawing operations.

Patent 3,210,278 **Field 11H**
METALLIC HALIDE THIOUREA COMPOUNDS.
Patent assigned to Cities Service Oil Company,
by Jack Ryer, Paul M. Kerschner andWalter C. Bradbury. 5 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Lubricant additives, Thiourea), (*Thiourea, Lubricant additives), Pressure, Zinc compounds, Cadmium compounds, Manganese compounds, Chlorine compounds, Bromine compounds, Iodine compounds, Amines, Metalorganic compounds, Halides, Patents.

Identifiers: Pressure-resistant agents.

Divalant metal halide-thiorea compounds are effective as extreme pressure additives in various lubricating compositions which include synthetic and mineral oil base lubricants. An intermediate N,N' or N,N,N'N', substituted thiourea is first synthesized and then reacted with a divalent metal halide to produce the divalent metal halide-thiourea compounds which are effective as extreme pressure additives. From 0.05 percent to 15.0 percent by weight of these extreme agents are added to mineral or synthetic oils.

Patent 3,210,279 **Field 11H**
THIOPHOSPHONATE ESTER DISPENSANTS FOR LUBRICATING OILS.
Patent assigned to Esso Research and Engineering Company,
by Joel R. Siegel. 5 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Lubricant additives, Organic phosphorus compounds), (*Organic phosphorus compounds, Lubricant additives), (*Organic sulfur compounds, Lubricant additives), Cleaning compounds, Surface-active substances, Polyethylene plastics, Fatty acid esters, Alcohols, Boric acids, Stearates, Hexoses, Patents.

Identifiers: Mannitol distearate, Phosphorothioates, Sorbitan oleates, Sugar alcoholates.

The reaction product of a phosphosulfurized polyolefin and an ester of a fatty acid of from 6 to 20 carbon atoms and a sugar alcohol is used as a lubricating oil additive. From 0.2 to 5.0 weight percent of the reaction product is used as an ashless detergent in crankcase lubricants for automotive gasoline engines. The sugar alcohol used in forming the reaction product is selected from the group consisting of hexitols, hexitans, and hexides.

Patent 3,210,280 **Field 11H**
CHLORINATED SULFURIZED ESTERS.
Patent assigned to FMC Corporation,
by Ernest J. Rich, Jr. 5 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Lubricant additives, Succinates), (*Succinates, Lubricant additives), Chlorine compounds, Organic sulfur compounds, Alkenes, Wear resistance, Chlorination, Sulfuration, Patents.

Identifiers: Anti-wear agents.

Chlorinated sulfurized diesters of alkenylsuccinic acids are used as lubricating oil additives for improved wear properties and load carrying capacity. The lubricating oil additive is produced by bubbling chlorine through a sulfurized diester of an alkenylsuccinic acid. From 0.1 to 15 percent by weight of the reaction products are used in motor oils and gear-lubricants.

Patent 3,210,281 **Field 11H**
LUBRICANT COMPOSITION CONTAINING METHYL- PHENYL-ALPHA-NAPHTHYLAMINES.
Patent assigned to California Research Corporation, San Francisco, Calif.
by Robert L. Peeler. 5 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Lubricant additives, Antioxidants), (*Antioxidants, Lubricant additives), (*Polycyclic compounds, Lubricant additives), Naphthalenes, Amines, Patents.

Identifiers: Dimethylphenyl naphthylamines, Trimethylphenyl naphthylamines.

Methylphenyl-alpha-naphthylamines are used in lubricating oils as nonsludging antioxidant additives. From 0.05 to 5.0 percent by weight of a substituted diaryl amine is used in lubricating oils and greases as an antioxidant. Diaryl amine is used effectively against polymeric deposits in oils and greases used in close tolerance machinery.

Patent 3,210,282 **Field 11H**
COPOLYMER CONCENTRATE AND OIL COMPOSITION.
Patent assigned to The Dow Chemical Company, Midland, Mich.,
by Charles R. Bearden. 5 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Lubricant additives, Polymers), (*Polymers, Lubricant additives), Vinyl plastics, Acrylic resins, Copolymerization, Catalysts, Free radicals, Cleaning compounds, Viscosity, Ketones, Patents.

Identifiers: Vinyl morpholinones.

N-vinyl-3-morpholinone is reacted with at least one acrylic ester to form a copolymer which is added as a detergent to lubricating oils. The copolymer greatly improves the dispersant and detergent properties, improves the viscosity index reduces the pour point, and induces prolonged resistance to sludge and varnish formation. From 0.1 to 20 weight percent of the copolymer is added to natural and synthetic lubricating oils.

Patent 3,210,283 **Field 11H**
LUBRICANT CONTAINING ALKENYL SUCCINIMIDE AND HYDROXYPOLYAMINE.
Patent assigned to California Research Corporation, San Francisco, Calif.,
by Frank A. Stuart and Robert G. Anderson. 5 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Lubricant additives, Organic nitrogen compounds), (*Organic nitrogen compounds, Lubricant additives), (*Succinimides, Lubricant additives), Amines, Alcohols, Polymers, Alkenes, Ethylenediamine, Cleaning compounds, Corrosion inhibition, Patents.

Identifiers: Hydroxyethyl ethylene diamines, Tetraethylene pentamines.

Alkenyl succinimides and hydroxypolyamines are used in lubricating compositions as metal-free detergents and ferrous corrosion inhibitors. A lubricating oil contains from 0.1 to 45 percent by weight of an alkenyl succinimide of tetraethylene pentamine and from 0.01 to 2 percent by weight of a hydroxypolyamine. These detergents are used to reduce the formation of sludges and varnishes in automotive lubricating oils.

Patent 3,211,478 **Field 11A**
ALUMINUM FOIL ULTRA-HIGH VACUUM GASKET SEAL.
Patent assigned to AEC,
by Thomas H. Batzer. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Vacuum seals, Gaskets), (*Gaskets, Vacuum seals), Aluminum, Foils, Patents.

Household aluminum foil may be utilized as the gasket material. The gasket can withstand high bakeout temperatures while functioning as an ultra-high vacuum seal. Mating flanges of similar configuration are utilized in making the seal. A reliable seal is effected by utilizing the combination of the particular seal surface design and the gasket of aluminum foil.

Patent 3,211,602 **Field 11A, 11I**
POLYTRIFLUOROCARBON ADHESIVE COMPRISING AN ALPHA-CARBOXYMETHYLACRYLATE COPOLYMER REACTED WITH AN EPOXY AND A POLYAMINOPOLYAMIDE RESIN.
Patent assigned to AEC,
by Harold R. Horstman. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Adhesives, Preparation), (*Halocarbon plastics, Bonding), Acrylic resins, Epoxy plastics, Amino plastics, Polyamide plastics, Aging (Materials), Chlorine compounds, Fluorine compounds, Plastics, Halohydrins, Linoleic acid, Amines, Patents.

Identifiers: Bis (hydroxyphenyl) dimethyl methanes, Diethylene triamine, Epichlorohydrin, Methyl methacrylate, Poly (chlorotrifluoro ethylenes).

Chlorotrifluoroethylene polymers and copolymers are joined to themselves or other materials by a resin adhesive. The adhesive can be prepared by reacting any polyamine with (the ester and/or carboyl groups of) an acrylic resin or any polyfunctional esters, and an epoxy resin.

Patent 3,211,637 **Field 11I, 11G, 11K, 11H**
HOMOPOLYMERS OF 4-CHLOROPERFLUOROHEPTADIEN E-1, 6.
Patent assigned to Navy,
by Leo A. Wall and James E. Fearn. 12 Oct 65

Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Heat-resistant plastics, Synthesis (Chemistry)), (*Halogenated hydrocarbons, Synthesis (Chemistry)), (*Dienes, Polymerization), Chlorine compounds, Fluorine compounds, Corrosion resistance, Coolants, Organic solvents, Plasticizers, Lubricants, Patents.

Identifiers: Poly (chloroperfluoro heptadienes).

The homopolymers are useful in the missile and rocket fields because of their high thermal and chemical resistance. The product is poly-4-chloroperfluoroheptadien e-1, 6 and, depending on its molecular weight, it may be utilized as a coolant, solvent, plasticizer, lubricant, or plastic.

Patent 3,211,647 **Field 11H**
HYPOID GEAR LUBRICANTS FOR SLIP-LOCK DIFFERENTIALS.
Patent assigned to Esso Research and Engineering Company,
by Rosemary O'Halloran and Louise K. Armington. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Differentials (Mechanical), Lubrication), (*Lubricant additives, Imines), (*Imines, Lubricant additives), Gears, Fatty acid esters, Chlorine compounds, Sulfur compounds, Zinc compounds, Phosphates, Amines, Patents.

Identifiers: Methylenimine, Pressure-resistant agents.

An azomethine compound, derived from aliphatic amines and formaldehyde, is combined with primary alky amines having from 12 to 24 carbon atoms in the alkyl radical to form an extreme pressure additive for gear oils. From 0.2 to 2.0 percent by weight of a tallow amine is blended into an oil base having a viscosity ranging from 50 to 220 SUS at 210 degrees F., and from 0.15 to 1.5 percent of an alkyl or alkenyl azomethine containing from 14 to 16 carbon atoms in the alkenyl group is employed. The final product may also contain from 1 to 20 percent of a sulfur and chlorine antiwear agent. The additive promotes the thermal and storage stability of the lubricant, which is indicated primarily for automobile slip-lock differentials.

Patent 3,211,648 **Field 11H**
LUBRICANTS CONTAINING METAL HYDROCARBONOXY-ALKYL AND HYDROCARBONOXY-ARYL PHOSPHOROTHIOATE-EPOXIDE REACTION PRODUCTS.
Patent assigned to Lubrizol Corporation, Wickliffe, Ohio,
by Thomas Robert Hopkins, Arthur N. Arakelian, andAlan Rhodes. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Lubricant additives, Organic phosphorus compounds), (*Organic phosphorus compounds, Lubricant additives), (*Organic sulfur compounds, Lubricant additives), Pressure, Organic oxygen compounds, Alkali metal compounds, Alkaline earth compounds, Zinc compounds, Phenyl ethers, Patents.

Identifiers: Phosphorodithioates, Pressure-resistant agents, Propylene oxide, Zinc di (methoxyphenoxy ethyl)phosphorodithioates, Zinc di (nonylphenoxy ethyl)phosphorodithioates.

The metal salts of phosphorodithioic acids having cycloalkoxy-alkyl, alkenyl-oxy alkyl, aryl-oxy alkyl, or alkaryl-oxy alkyl radicals are combined with epoxides to form an extreme pressure additive for gear lubricants. The epoxides specified are alkylene oxides such as propylene oxide, or epoxy alkyl carboxylic acids or epoxy alkanes. Zinc, lead, copper, calcium, or magnesium salts of phosphorodithioic acids are reacted at temperatures from 50 to 100 degrees C. with the epoxides in molar ratios varying from 1:0.5 to 1:1. Mineral and synthetic polyester oils having a viscosity of from 40 SUS at 100 degrees F. to 200 SUS at 210 degrees F. utilize from 1 to 20 percent of the additive by weight of final composition, and are suitable for gear and motor oils and as jet engine lubricants.

Patent 3,211,649 **Field 11H**
LUBRICANTS CONTAINING METAL PHOSPHOROTHIOATETHIOEPOXIDE REACTION PRODUCTS.
Patent assigned to Lubrizol Corporation, Wickliffe, Ohio,
by Thomas Robert Hopkins, Arthur N. Arakelian, andAlan Rhodes. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Lubricant additives, Organic phosphorus compounds), (*Organic phosphorus compounds, Lubricant additives), (*Organic sulfur compounds, Lubricant additives), S-heterocyclic compounds, Alkali metal compounds, Alkaline earth compounds, Zinc compounds, Pressure, Patents.

Identifiers: Phosphorodithioates, Pressure resistant agents, Propylene sulfides, Zinc di (methylpentyl) phosphorodithioates, Zinc di (nonylphenyl) phosphorodithioates.

An extreme pressure agent for gear lubricants and motor oils is the reaction product of metal salts of phosphorodithioic acid and thioepoxy alkanes, or lower alkenes, or alkyl carboxylic acids. The phosphordithioic acid contains alkyl, cycloalkyl, alkenyl, alkaryl, or cycloalkenyl radicals having from 1 to 30 carbon atoms, and is reacted with zinc, lead, copper, barium or calcium to form the metal salt. In one composition, zinc di (4-methyl-2-pentyl) phosphorodithioate is combined with ethylene sulfide in molar ratios ranging from 1:0.5 to 1:1. Oils are charged with from 1 to 20 percent by weight of the additive. Polyester oils such as didodecyl adipate and di-2-ethylhexyl sebacate incorporating the metal salt-epoxide compound are utilized as jet engine lubricants.

Patent 3,211,650 **Field 11H**
LUBRICATING GREASE AND METHOD OF MAKING THE SAME.
Patent assigned to Cato Oil and Grease Company, Inc.,
by Leon M. Oswalt. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Lubricants, Preparation), (*Greases, Preparation), Heat-resistant materials, Adhesion, Pressure, Stearic acids, Alcohols, Calcium compounds, Hydroxides, Polyethylene plastics, Soaps, Fatty acid esters, Patents.

Identifiers: Hydroxy stearic acids, Polyisobutylenes, Saponification, Calcium hydroxide.

An anhydrous calcium grease having improved adhesive properties, thermal stability, and extreme pressure characteristics incorporates from 8 to 12 percent by weight of polyisobutylene. The fatty component is 9,10 dior 9 or 12 hydroxy stearic acid, blended in a naphthenic oil medium with calcium hydroxide. The reaction is conducted at a temperature of 250 degrees F., and, on saponification, the temperature is reduced to 230 degrees by the addition of oil and a polyisobutylene polymer having a molecular weight ranging from 17,500 to 18,500. The grease is used in textile machinery, traveling cranes, and equipment which requires a non-spattering grease.

Patent 3,211,651 **Field 11H**
LUBRICATING COMPOSITIONS CONTAINING POLYETHER DERIVATIVES.
Patent assigned to Castrol Limited, London, England.
by John Scotchford Elliott and Eric Descamp Edwards. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Lubricant additives, Ethers), (*Polymers, Lubricant additives), (*Ethers, Lubricant additives), Halogenated hydrocarbons, Chlorine compounds, Bromine compounds, Alkenes, Organic sulfur compounds, Polymerization, Pressure, Patents.

Identifiers: Polyethers, Pressure-resistant agents.

Polyether derivatives are used as lubricating oil additives to impart extreme pressure properties. A polyether derivative such as polypropylene glycol poly (diisopropyl dithiophosphate) is used. From 0.5 to 5.0 percent of the polyether derivative is added to synthetic or mineral lubricating oils.

Patent 3,211,652 **Field 11H, 21D**
PHENOLIC COMPOSITIONS.
Patent assigned to Ethyl Corporation, New York, N. Y.
by James B. Hinkamp. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Lubricant additives, Antioxidants), (*Fuel additives, Antioxidants), (*Antiknock, Antioxidants), (*Antioxidants, Phenols), (*Phenols, Antioxidants), Polycyclic compounds, Gasoline, Waxes, Greases, Rubber, Fats, Oils, Metalorganic compounds, Lead compounds, Fatty acid esters, Additives, Organic phosphorus compounds.

Identifiers: Methylene Bis (ditertbutyl phenols), Methylene bisphenols.

Mixtures of methylenebis phenol compounds containing substantial amounts of asymmetric methylenebis phenols are used as antioxidants in lubricating oils. Lubricating oils containing from 0.001 to 5.0 percent by weight of this phenolic composition possess tremendous antioxidant potency, superior stabilization quality, superior solubility, lack of toxicity, and stability in storage and handling. The phenolic compositions are compatible with other lubricating oil additives such as extreme pressure agents, anti-rust agents, and dispersants. The antioxidants may also be used in antiknock compositions and in gasolines containing such compositions.

Patent 3,211,653 **Field 11H**
HYPOID GEAR LUBRICANTS FOR SLIP-LOCK DIFFERENTIALS.
Patent assigned to Esso Research and Engineering Company,
by Rosemary O'Halloran. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Differentials (Mechanical), Lubrication), (*Lubricant additives, Amines), (*Amines, Lubricant additives), Gears, Noise, Inhibition, Imines, Pressure, Patents.

Identifiers: Methylenimine, Noise reduction, Pressureresistant agents.

Primary alkyl amines of 12 to 24 carbon atoms are used as additives to gear lubricants. From 0.2 to 1.0 percent by weight of primary C12 to C24 alkyl amine is added to a gear lubricant to eliminate or reduce the noise or chatter in a limited slip differential. From 5 to 20 percent by weight of extreme pressure additives such as sulfurchlorine and phosphorussulfur-chlorine containing compounds are also used in the gear lubricant.

Patent 3,211,753 **Field 11J, 11H, 11A**
PREPARATION OF DIPHENYLPHOSPHINOUS AZIDE.
Patent assigned to Navy,
by Kazimiera J. L. Paciorek and Reinhold H. Kratzer. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Heat-resistant plastics, Organic phosphorus compounds), (*Elastomers, Organic phosphorus compounds), (*Organic phosphorus compounds, Elastomers), (*Nitriles, Elastomers), (*Lubricants, Organic phosphorus compounds), (*Seals, Organic phosphorus compounds), Azides, Acetonitriles, Lithium compounds, Preparation, Phosphines, Polymers, Patents.

Identifiers: Diphenylphosphinous azides, Polyphosphonitriles.

The diphenylphosphinous azide is used in the preparation of thermally stable phosphonitrilic polymers which are useful as elastomers, and also as lubricants and sealing agents. An acetonitrile solution of diphenylphosphinous chloride is added to a stirred suspension of powdered lithium azide in acetonitrile in an inert atmosphere at-18 to -14 degrees C. to form diphenylphosphinous azide. The acetonitrile is removed. Crystallization and filtering of the residue from pentane at -78 degrees C. follows to obtain the reaction compound (C6 H5)2PN3.

Patent 3,211,766 **Field 11I, 11J**
N-BIS (2-BENZOYLOXYETHYL)-FATTY ACID AMIDE ESTERS.
Patent assigned to Agriculture,
by Frank C. Magne, Robert R. Mod and Evald L. Skau. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Plasticizers, Amides), (*Amides, Plasticizers), (*Esters, Plasticizers), (*Polyvinyl chloride, Plasticizers), Ethers, Fatty acid esters, Vegetable oils, Nitrile rubber, Additives, Patents.

Identifiers: Bis (benzoyl oxyethyl)oleamides, Softening agents.

The subject amides can plasticize both the hydrophilic and the hydrophobic type of resins. They also confer softening characteristics on nitrile rubbers. The produce is N-bis (2-benzoyloxyethyl) oleamide and it is particularly useful in vinyl-chloride-type resins.

PB-168 569 **Field 11F**
CFSTI Prices: HC$3.00 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
APPLICATIONS OF ELECTRICAL RESISTIVITY MEASUREMENTS TO RESEARCH INTO THE PURIFICATION OF URANIUM USING FLOATING MOLTEN ZONE BY ELECTRONIC BOMBARDMENT (Applications des Mesures de Resistivite Electrique a l'Etude de la Purification de l'Uranium par Fusion de Zone Flottante par Bombardement Electronique).
Doctoral thesis,
by Jacques Lucien Pascal. 1965, 68p Rept. no. CEA-R-2740
Text in French, attached summary in English. Distribution: No limitation.

Descriptors: (*Uranium, Zone melting), (*Zone melting, Uranium), France, Purification, Electron bombardment, Resistance (Electrical), Vaccum apparatus, Anisotropy, Measurement.

The purification of uranium has been achieved by zone melting. Because of the high affinity of uranium towards elements such as oxygene, contamination has been avoided by adopting the florating zone technique and by working under high vacuum. The difficulties created by the deformations of uranium rod, which are caused by anisotropy of dilation of phases alpha and beta and allotropic transformations alpha reversibly yields beta and beta reversibly yields alpha have been overcome by the use of electron bombardment stabilized by feedback. A rough control of the purification was obtained by micrographic examination, microhardness measurements, and tests of secondary recrystallization, allowed us to appreciate the new degree of purity of the uranium obtained. The investigation of the purity degree was pursued by electrical resistivity measurements at 20K. But one had to take care in the interpretation of those measurements of the anisotropy of the uranium resistivity and the influence of structure on residual resistivity. Those measurements have led us, by determination of single crystal and uranium resistivity, to be able to distinguish between the principal resistivity against axis (100) and (010). (Author)

PWAC-441 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Pratt and Whitney Aircraft, Middleton, Conn. Aircraft Nuclear Engine Lab.
UTILIZATION OF YTTRIUM IN GETTERING OXYGEN AND NITROGEN IN COLUMBIUM BASE MATERIALS,
by C. E. Carlson and E. J. Delgrosso. 24 Jun 65, 21p
Contract AT (30-1)-2789
Distribution: No limitation.

Descriptors: (*Niobium alloys, Arc melting), (*Yttrium, Niobium alloys), Oxygen, Nitrogen, Degasification.

RFP-506 **Field 11F, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
DELTA STABILIZED TERNARY ALLOYS OF PLUTONIUM,
by J. E. Fuller. 22 Apr 65, 22p
Contract AT (29-1)-1106
Distribution: No limitation.

Descriptors: (*Plutonium alloys, Stabilization), (*Phase studies, Plutonium alloys), Aluminum alloys, Gallium alloys, Zinc alloys, Cerium alloys.

RFP-518 **Field 11B, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
CERAMICS, RESEARCH AND DEVELOPMENT.
Quarterly progress rept. for Oct-Dec 61,
by D. J. Kessel. 21 May 65, 23p
Contract AT (29-1)-1106
Distribution: No limitation.

Descriptors: (*Ceramic materials, Hot working), (*Sintering, Ceramic materials).

RFP-545 **Field 11I**
CFSTI Prices: HC$1.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
MARASET EPOXY RESIN AND COORS PELLETIZED ALUMINA AS A METALLOGRAPHIC SPECIMEN POTTING COMPOUND,
by A. E. Calebra. 20 Apr 65, 19p CONF-650414-2
Contract AT (29-1)-1106
Distribution: No limitation.

Descriptors: (*Embedding substances, Metallography), (*Metallography, Embedding substances), Oxides, Additives, Epoxy plastics, Aluminum compounds.

TID-21874 **Field 11I, 7E**
CFSTI Prices: HC$4.00 MF$1.00
Minnesota Univ., Minneapolis.
EFFECTS OF ATOMIC IRRADIATION AND OF MOLECULAR ORIENTATION ON THE MECHANICAL BEHAVIOR OF LINEAR HIGH POLYMERS.
Final technical rept.,
by C. C. Hsiao. Feb 65, 143p
Contract AT (11-1)-532
Distribution: No limitation.

Descriptors: (*Polymers, Mechanical properties), (*Radiation damage, Polymers).

TID-22015 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge.
THERMODYNAMIC AND OTHER ASPECTS OF METALLIC SYSTEMS.
Annual progress rept.,
by M. B. Bever, P. M. Robinson, A. L. Titchener, A. Gangulee and K. C. Chuang. Jun 65, 12p
Contract AT (30-1)-1002
Distribution: No limitation.

Descriptors: (*Metals, Thermodynamics), (*Alloys, Deformation), (*Intermetallic compounds, Annealing).

12. MATHEMATICAL SCIENCES

BNL-934 **Field 12A, 20H**
CFSTI Prices: HC$2.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
A STUDY OF GENERALIZE LEVEL DENSITY BY THE METHODS OF DIFFERENTIAL-RECURRENCE EQUATIONS,
by Peter B. Kahn and Charles E. Porter. Jul 65, 27p BNL-T-386
Contract AT-30-2-GEN-16
Distribution: No limitation.

Descriptors: (*Nuclei, Density), (*Density, Determination).

K-1633 **Field 12A**
CFSTI Price: HC$2.00 MF$0.50
Oak Ridge Gaseous Diffusion Plant, Tenn.
BIASES AND COVARIANCES OF MAXIMUM LIKELI- HOOD ESTIMATORS,
by K. O. Bowman and L. R. Shenton. 19 May 65, 24p
Contract W-7405-eng-26
Prepared in cooperation with Oak Ridge National Lab., Tenn. Distribution: No limitation.

Descriptors: (*Statistical analysis, Binomials).

K-1643 **Field 12A**
CFSTI Price: HC$5.00 MF$1.25
Oak Ridge National Lab., Tenn.
ASYMPTOTIC COVARIANCES FOR THE MAXIMUM LIKELIHOOD ESTIMATORS OF THE PARAMETERS OF A NEGATIVE BINOMIAL DISTRIBUTION,
by K. O. Bowman and L. R. Shenton. 1 Jul 65, 151p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Binomials, Distribution theory).

LA-3262 **Field 12A, 14B**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
ON THE PROPER USE OF TRANSFORMATIONS OF LOG NORMAL FUNCTIONS IN SMALL PARTICLE STATISTICS,
by A. Goldman, H. D. Lewis and R. H. Moore. Dec 64, 32p
Contract W-7405-eng-36
Distribution: No lim
Distribution: No limitation.

Descriptors: (*Particle size, Determination), (*Statistical functions, Particle size).

LA-3292 **Field 12A, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
A FORTRAN VERSION OF NORDSIECK'S SCHEME FOR THE NUMERICAL INTEGRATION OF DIFFERENTIAL EQUATIONS,
by H. R. Lewis, Jr. and E. J. Stovall, Jr. Mar 65, 36p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Differential equations, Integration), (*Integration, Programming (Computers)).

Identifiers: FORTRAN, IBM 7094.

LA-3355 **Field 12A, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
A SIMPLE METHOD FOR FINDING THE ZEROS OF POLYNOMIALS, BASED ON d'ALEMBERTS LEMMA,
by Zane C. Motteler. 15 Jul 65, 24p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Polynomials, Algebra).

Identifiers: Zeroes.

N65-16495 **Field 12A, 5J**
CFSTI Prices: HC$1.00 MF$0.50
Kent State Univ., Ohio.
STCHASTIC MODELS FOR MULTI-VALUED MULTIDEMENSIONAL RELATIONS.
Semiannual status rept. Oct 15-Apr 15 65,
by T. M. Bhargava. 16 Apr 65, 20p
Contract NSG568
NASA CR-56157
Distribution: No limitation.

Descriptors: (*Stochastic processes, Group dynamics), Mathematical models, Graphics, Topology.

Identifiers: Point set topology.

N65-16839 **Field 12B**
CFSTI Prices: HC$1.00 MF$0.50
Rensselaer Polytechnic Inst., Troy, N. Y.
ANALYSIS OF PIECE-WISE LINEAR SYSTEMS BY THE METHOD OF INTEGRAL EQUATIONS,
by C. N. Shen and H. Wang. 1962, 23p
Contract NSG1459
NASA CR-51788
Distribution: No limitation.

Descriptors: (*Control systems, Linear systems), (*Integral equations, Control systems).

N65-17286 **Field 12A, 9E**
CFSTI Prices: HC$1.00 MF$0.50
Michigan Univ., Ann Arbor.
SOME EXPLICIT RESULTS IN MULTIVARIATE PREDICTION THEORY,
by F. J. Beutler. 1963, 18p
Contract NSG2 59
NASA CR-60778
Presented at the Midwest Symp. on Circuit Theory, (6th) Madison, Wis., 6-7 May 1963. Distribution: No limitation.

Descriptors: (*Mathematical prediction, Statistical processes), (*Statistical processes, Mathematical prediction), Circuits, Theory.

N65-18048 **Field 12A**
CFSTI Prices: HC$4.00 MF$1.00
Michigan Univ., Ann Arbor. Dept. of Aeronautical and Astronautical Engineering.
STATIONARY POINT PROCESSES AND THEIR APPLICATION TO RANDOM SAMPLING OF STOCHASTIC PROCESS,
by O. A. Z. Leneman. Nov 64, 129p
Contract NSG 2 59
NASA CR-60997
Distribution: No limitation.

Descriptors: (*Monte Carlo method, Stochastic processes), (*Stochastic processes, Monte Carlo method), Communication theory, Control, Theory.

Identifiers: Stationary point processes.

N65-29683 **Field 12A, 9C**
CFSTI Prices: HC$2.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge.
A MATRIX EQUATION ARISING IN STATISTICAL FILTER THEORY,
by James E. Potter. Aug 65, 27p
Grant NsG254
NASA CR-270
Distribution: No limitation.

Descriptors: (*Differential equations, Filters (Electromagnetic wave)).

Identifiers: Statistical filtering.

ORNL-3655 **Field 12A**
CFSTI Prices: HC$3.00 MF$0.50
Oak Ridge National Lab., Tenn.
ON THE RADICAL OF A HEMIRING.
Doctoral thesis,
by D. R. LaTorre. Jul 65, 50p
Contract W-7405-eng-26
Submitted to the Univ. of Tennessee. Distribution: No limitation.

Descriptors: (*Rings (Mathematics), Theorems).

Identifiers: Theses, Hemiring.

ORNL-3742 **Field 12A**
CFSTI Prices: HC$3.00 MF$0.50
Oak Ridge National Lab., Tenn.
A GENERALIZED ONE-CONSTRAINT LAGRANGE MULTIPLIER NUMERICAL FORMULATION,
by F. H. S. Clark and F. B. K. Kam. Jun 65, 46p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Numerical analysis, Partial differential equations).

TID-22032 **Field 12A**
CFSTI Prices: HC$5.00 MF$1.00
Notre Dame Univ., Ind.
CONVEX SETS AND THEIR APPLICATIONS,
by Ky Fan. 1959, 162p
Contract AT (11-1)-427
Distribution: No limitation.

Descriptors: (*Convex sets, Theory).

UCRL-11408 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Berkeley.
THE METHOD OF BOOLEAN SIGNATURES: AN APPLICATION OF BOOLEAN ALGEBRA TO THE STATISTICAL ANALYSIS OF EXPERIMENTS,
by Alan Natapoff. 5 May 64, 21p
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Algebras, Statistical analysis), (*Statistical analysis, Experimental data).

UCRL-12359 **Field 12A, 20H, 20J**
CFSTI Prices: HC$3.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Livermore.
WIGNERS ANALYSIS OF THE UNITARY REPRESENTATIONS OF THE POINCARE GROUP,
by Francis R. Halpern and Elbert Bradscomb. Feb 65, 61p
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Groups (Mathematics), Quantum mechanics).

Identifiers: Wigner's analysis.

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

C13.46-321 **Field 13H, 11F**
CFSTI Price: MF$0.50
National Bureau of -Standards, Boulder, Colo. Cryogenics Div.
SPARK PLANING DAMAGE IN COPPER.
Technical note,
by John J. Gniewek, Alan F. Clark, andJohn C. Moulder. 6 Sep 65, 11p Rept. no. TN-321
Hard copy available from Superintendent of Documents, GPO, Washington, D. C. 20402, $0.15.

Descriptors: (*Spark machining, Copper), (*Copper, Spark machining), Crystal lattice defects, Damage.

The damage to copper crystals, produced by spark planing operations, has been measured using a dislocation etch pit technique. The tabulated results show the depth of damage to vary from 0.7 - 1.1 mm on the coarsest planing range used to 0.2 - 0.3 mm on the finest range. Two photomicrographs showing the etch pit density increase near the spark planed surface are included. (Author)

EURAEC-1227 **Field 13H, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Ghent Rijksuniversiteit (Belgium).
WELDING OF VERY THICK STEELS.
Quarterly rept no. 12, 1 Jul-30 Sep 64.
30 Sep 64, 32p
Contract 042-61-9-RDB
Distribution: No limitation.

Descriptors: (*Steel, Welding), (*Welding, Steel).

EURAEC-1378 **Field 13H**
CFSTI Prices: HC$1.00 MF$0.50
Roentgen Technische Dienst, N. V., Rotterdam (Netherlands).
NON-DESTRUCTIVE WELDING TESTS.
Quarterly rept no. 14, 1 Oct-31 Dec 64.
29 Apr 65, 24p EUR-2339
Contract 045-61-5 RDH
Distribution: No limitation.

Descriptors: (*Non-destructive testing, Welds), (*Welds, Non-destructive testing).

HASL-160 **Field 13L, 14B**
CFSTI Prices: HC$6.00 MF$1.00
Health and Safety Lab., New York Operations Office (AEC), N. Y.
CONTROL OF LIQUID HYDROGEN HAZARDS AT EXPERIMENTAL FACILITIES. A REVIEW,
by A. A. Weintraub. May 65, 257p
Distribution: No limitation.

Descriptors: (*Liquified gases, Hydrogen), (*Hydrogen, Hazards).

LA-3302 **Field 13H, 11A**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
FEASIBILITY OF BRAZED JOINTS BETWEEN Cb-1 Zr ALLOY AND ALUMINA CERAMICS,
by R. S. Kirby and J. D. LaMotte. 1 Dec 64, 25p

Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Joints, Brazing), (*Niobium alloys, Ceramic materials), (*Seals, Brazing).

N65-17951 **Field 13M, 20K, 9B**
CFSTI Prices: HC$3.00 MF$0.75
Western Development Labs., Philco Corp., Palo Alto, Calif.

STRUCTURAL ANALYSIS SYSTEM USAGE REPORT,
by Robert J. Melosh, Philip A. Diether, andMary Brennan. Jul 63, 87p Rept. no. WDL-EMO-763
Contracts NAS7 100, JPL950 321
NASA CR-60975
Distribution: No limitation.

Descriptors: (*Structures, Mathematical analysis), Programming (Computers).

N65-18912 **Field 13D**
CFSTI Prices: HC$1.00 MF$0.50
Martin Co., Baltimore, Md.
FABRICATION OF HELIUM STORAGE BOTTLES.
Quarterly progress rept. no. 5, Nov 64-Jan 65. 1965, ep
Contract NAS811555
NASA CR-57147
Distribution: No limitation.

Descriptors: (*Helium, Storage tanks), (*Storage tanks, Helium).

N65-20755 **Field 13K**
CFSTI Prices: HC$4.00 MF$0.75
IIT Research Inst., Chicago, Ill. Technology Center.
BACKSTREAMING FROM OIL DIFFUSION PUMPS.
Summary rept 1 Dec 63-30 Nov 64,
by William M. Langdon. 18 Dec 64, 102p
IITRI-C6030-4
Contract NAS65 (08)
NASA CR-57739
Distribution: No limitation.

Descriptors: (*Diffusion pumps, Operation).

N65-26406 **Field 13H**
CFSTI Prices: HC$1.00 MF$0.50
Douglas Aircraft Co., Inc., Santa Monica. Calif. Missile and Space Systems Div.
DEVELOPMENT OF THE ALL-WELDED COMMON BULKHEAD.
Monthly rept. 1-31 Jan 65,
by A. C. Robertson. 1965, 14p SM-47814
Contract NAS8 11696
NASA CR-63436
Distribution: No limitation.

Descriptors: (*Welding, Sandwich panels), (*Sandwich panels, Honeycomb cores).

N65-28692 **Field 13G**
CFSTI Prices: HC$6.00 MF$1.25
Sperry Utah Co., Salt Lake City.
ANALYTICAL INVESTIGATION OF FLUID AMPLIFIER DYNAMIC CHARACTERISTICS, VOLUME II,
by F. R. Goldschmied, H. L. Fox, andD. L. Letham. Jul 65, 206p
Contract NAS8 11236
NASA CR-245
Distribution: No limitation.

Descriptors: (*Fluid flow, amplifiers), (*Amplifiers, Fluid flow).

Identifiers: Fluid control devices, Fluid amplifiers.

NAA-SR-MEMO-10992 **Field 13A, 18L**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
NAA PROGRAM DESCRIPTION. SUPERCRITICAL STEAM GENERATOR.
by Gwendolynne T. Chang. Feb 65, 31p
Contract AT-11-1-GEN-8
Distribution: No limitation.

Descriptors: (*Generators, Steam), (*Steam, Heat transfer).

NAA-SR-10485 **Field 13A, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
A ROTARY KILN FOR THE CONTROLLED OXIDATION OF UC,
by S. Strausberg. 30 Jun 65, 26p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Furnaces, Oxidation), (*Uranium compounds, Carbides).

NAA-SR-4527 Part II **Field 13M, 12A, 20K**
CFSTI Prices: HC$5.00 MF$0.75
Atomics International, Canoga Park, Calif.
ANALYSIS OF STRESSES IN BELLOWS. PART II. MATHEMATICAL,
by W. F. Anderson. 27 May 65, 161p
Contract AT- (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Structural parts, Mathematical analysis), (*Stresses, Structural parts).

NYO-2512-1 **Field 13I**
CFSTI Prices: HC$6.00 MF$1.25
Franklin Inst. Research Labs., Philadelphia, Pa.
DESIGN GUIDE FOR GAS-LUBRICATED TILTING-PAD JOURNAL AND THRUST BEARINGS WITH SPECIAL REFERENCE TO HIGH-SPEED ROTORS,
by Edgar J. Gunter, Jr., James G. Hinkle, and Dudley D. Fuller. Nov 64, 230p I-A2392-3-1
Contract AT (30-1)-2512
Distribution: No limitation.

Descriptors: (*Journal bearings, Design), (*Thrust bearings, Design), (*Gas bearings, Design).

ORNL-P-494 **Field 13B, 4B**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
RADIO-RELEASE METHODS FOR THE EVALUATION OF ATMOSPHERIC POLLUTION, SULFUR DIOXIDE,
by H. H. Ross and W. S. Lyon. 1964, 13p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Air pollution, Sulfur compounds), (*Sulfur compounds, Air pollution), Dioxides, Monitors, Chemical analysis.

ORNL-TM-1183 **Field 13M**
CFSTI Prices: HC$4.00 MF$1.00
Holmes and Narver, Inc., Los Angeles, Calif.
ENGINEERING AND COST CONSIDERATIONS FOR TUNNEL GRID BLAST SHELTER CONCEPT,
by David L. Narver, Jr. and Donald T. Robbins. Aug 65, 130p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Shelters, Costs), (*Construction, Shelters).

Patent 3,202,326 **Field 13D**
LIQUID EXPULSION SYSTEM.
Patent assigned to Air Force,
by Albert L. Young. 24 Aug 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Expulsion bladders, Pressure vessels), Liquids, Center of gravity, Control, Sloshing, Spheres, Patents.

The spherical pressure-tight container or tank has structure for retaining a fluid, or two fluids, in a confined position during a complete expulsion cycle thereof while eliminating swashing and center of gravity shift of the fluids caused by induced 'G' loadings of the container. A compressing fluid is introduced into the container to expel a fluid from the container.

Patent 3,208,087 **Field 13F, 13M**
AMPHIBIOUS ASSAULT BRIDGE.
Patent assigned to Army,
by Theodoric B. Edwards. 28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Bridges, Amphibious vehicles), (*Amphibious vehicles, Bridges), Patents.

The assault bridge can be driven into position in a very short time and bridge nearly any type terrain or body of water. The structure can be used as a bridge or ferry. Two of the structures can be joined to form a longer bridge. Each unit consists of an assault vehicle which carries foldable ramps, girders and flooring.

Patent 3,208,289 **Field 13I**
ROTARY SHAFT CONSTRUCTION WITH DIAPHRAGM TYPE OF SEAL.
Patent assigned to AEC,
by Ernest Hutter and Peeter Elias. 28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Shafts, Construction), Seals (Stoppers), Diaphragm (Mechanics), Drive shafts, Patents.

A two-part rotary shaft construction is disclosed which has a diaphragm type of seal. The aligned driving and driven shafts carry aligned reduced eccentric extensions which are associated with a shiftable drive-transmitting plate. There is no relative rotation between the collar of the sealing element and the plate. Wear of the collar due to rubbing is eliminated.

Patent 3,208,544 **Field 13F, 15E**
STEPPING WHEEL VEHICLE.
Patent assigned to Army,
by James W. Colvin. 28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Vehicle wheels, Design), (*Vehicles, Armed forces transportation), Patents.

The vehicle is for military use in off-road operations, such as crossing areas of deep snow, ridged ice, desert terrain and streams too deep for ordinary vehicles. The vehicle has four large wheels, each including a central hub and six wheels arranged around the hub in planetary fashion. The vehicle has three modes of locomotion, that is, a non-stepping mode, a basic mode and a combined stepping and rolling mode.

Patent 3,211,063 **Field 13G**
PRESSURE CONTROL SWITCHING VALVE.
Patent assigned to Navy,
by Woodrow Seamone. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Servomechanisms, Pressure regulators), (*Pressure regulators, Servomechanisms), Hydraulic servomechanisms, Patents.

The fluid servo control valve operates efficiently on either hydraulic fluid or pressurized gas. A valve is provided wherein the source of pressure for each upstream orifice is derived from the opposite load cylinder port rather than the supply pressure thereby providing a differential load feedback loop in the valve.

Patent 3,211,128 **Field 13H, 20L**
VACUUM EVAPORATOR APPARATUS.
Patent assigned to Navy,
by Roy F. Potter and George G. Kretschmar. 12 Oct 65

Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Semiconducting films, Crystal (Growth), (*Crystal growth, Vacuum apparatus), (*Vacuum apparatus, Evaporators), Films, Patents.

The vacuum evaporator apparatus is for preparing crystal films on a substrate. The electrical connections are brought through a copper plate from which the apparatus is suspended so that the whole apparatus may be hung from the flanged end of a glass pipe and sealed with single O-ring seal. The substrate is 'open' and heated from the top only by a wide area surface heater. The crucible heaters are independently shielded by compact double heat shields of tantalum so that the temperatures can be independently controlled. A cooling coil inside the vacuum space improves the temperature stability when water is circulated.

Patent 3,211,169 **Field 13K**
SHRINK-FIT GAS VALVE.
Patent assigned to NASA,
by Hasell W. Crouch and Norman E. Peterson, Jr. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Pneumatic valves, Vacuum apparatus), Seals (Stoppers), Patents.

Patent 3,211,639 **Field 13I, 11G, 13H**
APPARATUS FOR ELECTROPHORETIC DEPOSITION OF LAMELLAR FLUORPHLOGOPITE MICA SHEETS.
Patent assigned to Army,
by William McNeill and Thomas J. Mackus. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Dielectrics, Electrodeposition), (*Mica, Electrodeposition), (*Electrophoresis, Mica), Electrolytic cells, Electrodes (Electrolytic cell), Sheets, Manufacturing methods, Synthetic stones, Patents.

The apparatus is for the electrophoretic deposition of large lamellar sheets of mica from a suspension of particles of synthetic mica. The sheets are used in electronic applications. The apparatus includes an electrophoretic cell, an electrode assembly and an upright inlet pipe standing vertically in the cell and having orifices near the bottom through which air is pumped to provide a uniform circulation of the suspension in the cell.

Patent 3,211,884 **Field 13I, 18G**
CANNING MACHINE.
Patent assigned to ARC,
by Ernest R. Boller. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Containers, Reactor materials), (*Industrial equipment, Reactor fuel cladding), Fission products, Reactor fuel rods, Corrosion inhibition, Machines, Patents.

The machine is for the application of cans to metal uranium rods or tubes to protect them against corrosive agents and for retaining products of nuclear fission. The structure includes a can-supporting structure having a wall-supporting element and a removable base, and a vertical plunger located above the wallsupporting element and coordinated with the removable base so as to expel the assembled units from the machine at the proper time. The can-supporting structure is provided with suitable heating elements both in the wallsupporting element and the base to provide the desired operating temperatures.

Patent 3,212,110 **Field 13J, 19H**
COLLAPSIBLE ANCHOR AND BUOY.
Patent assigned to Navy,
by Paul A. Lombardo. 19 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Underwater object locators, Anchors (Marine)), (*Anchors (Marine), Expandable structures), Buoys, Pneumatic devices, Sonar, Patents.

The buoy-anchor combination can be accurately fired from a pneumatic gun or the like. The structure includes mechanical devices to separate the buoy and the collapsible anchor upon striking water and to cause the anchor to expand thereupon. The buoy-anchor combination can be fired from a mechanism similar to a conventional mortar.

Patent 3,212,153 **Field 13E**
SNAPHOOKS.
Patent assigned to Army,
by Michael J. Lynch. 19 Oct 65,
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Hooks, Fastenings), (*Fastenings, Parachutes), Cables (Mechanical), Springs, Mechanical fasteners.

The snaphook connects the static line of a parachute, either personnel or cargo, to the anchor cable in an aircraft so that the parachute is automatically released and opened upon tensioning of the static line. The structure is such that the metal shell of the fastener is protected against abrasion by the static line at all times.

Patent 3,214,833 **Field 13H, 11B, 11F**
CERAMIC TO METAL BONDING PROCESS.
Patent assigned to AEC,
by George F. Erickson. 2 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Bonding, Composite materials), (*Metal coatings, Ceramic materials), Refractory metals, Titanium, Zirconium, Beryllium compounds, Oxides, Tantalum, Niobium, Patents.

An interface metallic foil of titanium or zirconium is placed over the beryllia body and with tantalum niobium placed on the other side of the interface foil. The stacked arrangement is heated to a temperature below the melting point of the interface metal foil for a few minutes. The products can be used as an insulator assembly in a plasma thermocouple, in nuclear reactor applications, in transmitting-receiving tubes and combustion tubes of jets and rockets.

Patent 3,214,923 **Field 13A, 15E**
VORTEX DEVICE FOR OBTAINING BOTH HOT AND COLD AIR FROM A SINGLE AIR SUPPLY INPUT.
Patent assigned to Army,
by Rocco R. Palmisano and John A. Drager. 2 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Air conditioning equipment, Personnel), (*Personnel, Air conditioning equipment), Vortices, Heating, Cooling, Patents.

The vortex device may be used as a personal air conditioner under protective clothing of any kind. The device is of small dimension to fit under the clothing. Hot and cold gaseous streams are produced from a gas moving with a vortex motion. Cool gas is obtained by expansion of the gas into a lower pressure chamber. The hot gas is removed from a point adjacent the gas inlet.

PB-168 591 **Field 13J**
CFSTI Prices: HC$3.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Dept. of Naval Architecture and Marine Engineering.
ADDED MASS AND DAMPING COEFFICIENTS FOR SHIPS HEAVING IN SMOOTH WATER,
by R. T. Bermejo. Jun 65, 75p Rept. no. 65-5
Contracts MA-2720, MIT-DSR-5054
Distribution: No limitation.

Descriptors: (*Ships, Oscillation), Damping, Mathematical prediction, Vibration, Frequency, Weight, Integration.

Theoretical predictions of the added mass and damping coefficient curves for ships performing small vertical oscillations in calm water are determined. A method for the inversion of a power series type transform which conformally maps a unit circle into cylinders and ship-like forms is shown. Using this method, the transform coefficients corresponding to the sections of the ships considered are obtained. From these transform coefficients, plots of the sectional added mass and damping coefficients against frequency of vibration are derived using Porter's analytical solution to the problem. Comparisons are made between these curves and Grim's predictions. Finally, by virtue of strip theory, the two-dimensional values for each cross section are integrated over the length of the ship to obtain the ship's added mass and damping coefficients at each frequency considered. No correction is made for three-dimensional effects. The resultant curves for each ship are compared with the corresponding published experimental results. (Author)

PB-168 630 **Field 13J**
CFSTI Prices: HC$3.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Dept. of Naval Architecture and Marine Engineering.
THE EXPERIMENTAL DETERMINATION OF SHIP MOTION PARAMETERS BY A STEP RESPONSE TECHNIQUE FOR A MARINER CLASS HULLFORM IN PITCH AND HEAVE,
by D. H. Hines and L. C. Gies. Jun 65, 89p
Rept. no. 65-4, DSR-5054
Contract MA2710
Distribution: No limitation.

Descriptors: (*Ships, Motion), (*Merchant vessels, Model tests), Ship models, Ship hulls, Pitch (Motion), Equations of motion, Partial differential equations, Differential equations, Damping, Moment of inertia, Experimental data, Stability.

In its motion response to a disturbance, a ship can be closely approximated as a second order system. The solution of these second order equations is used to determine the motion stability of the ship. By applying a step disturbance to a ship model and measuring the response, the linearity can be used to find the response to any disturbance. In this work a step disturbance was applied to a Mariner class hullform and the response measured. From this response the response to regular sinusoidal excitations was computed. The response to the sinusoidal inputs was then used to determine the coefficients of virtual inertia and damping for the Mariner in pitch and heave. The derived results at zero speed were compared with values computed by strip theory. (Author)

PB-168 639 **Field 13L**
CFSTI Prices: HC$3.00 MF$0.75
Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
FIRE INCIDENCE AND INHIBITION; A REPORT BIBLIOGRAPHY.
May 65, 86p
CFSTI RB-2 canceled
Distribution: No limitation.

Descriptors: (*Fire safety, Bibliographies), Nuclear explosion damage, Heat-resistant materials, Fibers (Synthetic), Fire-resistant textiles, Plastics, Propellants, Reentry vehicles, Hydraulic fluids, Flammability, Flame propagation, Fires, Aircraft fires, Ignition, Fire extinguishers, Refractory metals, Refractory metal alloys, Refractory coatings, Thermal radiation, Submarines, Fuels, Shelters.

The bibliography is in the area of fire incidence and fire inhibition. Its purpose is to present to those in the field of fire research an indication of the current reports available to them through the Clearinghouse.

PB-168 647 **Field 13F, 1A**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif.
BUFFETING TESTS ON THE HUDSON TUBE.
Final rept.,
by E. G. Chilton. 4 Jun 65, 30p
Contract C-209-65 (neg),
Proj. SRI-PHU-5391
Distribution: No limitation.

Descriptors: (*Buffeting, Railroad cars), (*Railroad cars, Aerodynamic characteristics), (*Underground structures, Railroads), (*Aerodynamics, Railroad cars), Pressure, Oscillation, Pain, Thresholds (Physiology).

Identifiers: Northeast Corridor Transportation Project, Hudson railroad tube.

Buffeting tests were made on a two-car train of the Pennsylvania Railroad as it entered the Hudson tube. The pressure outside the train was measured at its head and at two locations along its side. The pressure inside the car was also measured. Tests were made at speeds between 55 and 70 mph. Results of these tests show that the pressure at the head rises abruptly when the nose of the train enters the tunnel, and gradually to a maximum of about 6 inches of water when the tail of the train enters. Beyond that time the pressure decreases. At the sides the initial abrupt rise is apparent only near the front of the first car and even there its severity is much smaller than at the head. Halfway along the first car the abrupt jump could not be detected. The subsequent gradual pressure rise is observed on all gages and is about equally steep everywhere. The pressure inside the car, which is the pressure experienced by a passenger, rises to a maximum of about 2.5 inches of water at a rate of about 1.5 inches of water per second. This pressure rise was noticeable but not painful. Since the maximum pressure increases as velocity squared and the rate of rise increases as velocity cubed, it seems clear that buffeting will be an important problem whenever speeds are significantly increased. (Author)

RFP-375 **Field 13I**
CFSTI Prices: HC$1.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
HYDROSTATIC BEARINGS,
by R. W. Skulski. 12 Apr 65, 11p CONF-640407-1
Contract AT (29-1)-1106
Presented at the Annual General Meeting of IMOG (3rd) Lawrence Radiation Lab., Livermore Apr 14-17, 1964. Distribution: No limitation.

Descriptors: (*Bearings, Hydrostatics).

RFP-488 **Field 13D, 9B, 18D**
CFSTI Prices: HC$3.00 MF$0.75
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
VOLUMETRIC CALIBRATION OF PROCESS VESSELS USING DIGITAL COMPUTER TECHNIQUES,
by L. W. Doher and J. A. Schulz. 1 Jul 65, 67p

Contract AT (29-1)-1106
Distribution: No limitation.

Descriptors: (*Tanks (Containers), Calibration), (*Digital computers, Calibration), (*Curve fitting, Computer logic).

SC-DR-65-74 **Field 13H**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
AUTOMATIC INDUCTION SOLDERING,
by M. J. Davis. Mar 65, 12p
Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Soldering, Automatic), Induction heating, Processing, Infrared equipment, Radiometers, Control systems.

SC-M-65-79 **Field 13I**
CFSTI Prices: HC$6.00 MF$1.75
Sandia Corp., Albuquerque, N. Mex.
TABLE OF 20,000 GEAR RATIOS 1.0000 TO 3.0000,
by R. L. Lachance and F. O. Lane. Feb 65, 202p

Contract AT (29-1)-789
Distribution: No limitations.

Descriptors: (*Gears, Tables), (*Tables, Gears).

SC-TM-65-48 **Field 13I**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
AN ADJUSTABLE POSITIVE-LIMIT MAGNETIC TORQUE WRENCH,
by J. H. Walker. Mar 65, 15p N65-19813
Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Wrenches, Torque), (*Magnets, Wrenches), Electromagnets.

SC-TM-65-87 **Field 13J**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
SUBSURFACE MARINE DYE MARKER EVALUATION,
by George Voida and Cecil Page. May 65, 17p

Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Markers, Marine safety equipment).

SWRI-1228-60 **Field 13I, 11H**
CFSTI Prices: HC$4.00 MF$0.75
Southwest Research Inst., San Antonio, Tex. Dept. of Aerospace Propulsion Research.
FUNDAMENTAL INVESTIGATION OF LIQUID-METAL LUBRICATED JOURNAL BEARINGS.
Topical rept.,
by R. A. Burton, H. J. Carper, and Y. C. Hsu. 16 Apr 65, 109p
Contract AT (11-1)-1228
Distribution: No limitation.

Descriptors: (*Journal bearings, Lubrication), (*Lubricants, Liquid metals).

14. METHODS AND EQUIPMENT

C13.46-262 **Field 14B**
CFSTI Price: MF$1.00
National Bureau of Standards, Washington, D.C. Inst. for Basic Standards.
ACCURACY IN MEASUREMENTS AND CALIBRATIONS, 1965.
Technical note,
ed. by W. A. Wildhack, R. C. Powell, and H. L. Mason. 15 Jun 65, 146p Rept. no. TN-262
Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $1.00.

Descriptors: (*Calibration, Errors), (*Measurement, Errors), Statistical analysis, Physical properties, Electrical properties, Mechanical properties, Electromagnetic properties, Graphics, Standards.

NBS estimates of uncertainties associated with physical measurements, and with some NBS calibration services, are shown by 66 provisional 'accuracy charts.' Each chart is accompanied by a facing page giving a brief statement of the state of the art and tentative plans for NBS work in areas where improvement is needed. (Author)

GEMP-89 **Field 14B, 18D**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., Cincinnati, Ohio. Nuclear Materials and Propulsion Operation.
CAPACITANCE TEMPERATURE SENSOR.
Final rept.,
by D. E. Joyce. 25 Jun 65, 55p
Contract AT (40-1)-2847
Distribution: No limitation.

Descriptors: (*Temperature sensitive elements, Ceramic capacitors), (*Ceramic capacitors, Temperature sensitive elements).

N65-17848 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Illinois Univ., Urbana. Coordinated Science Lab.
EFFECTS OF ELECTRON-SURFACE INTERACTION IN IONIZATION GAUGES,
by W. C. Schuemann, J. L. de Segovia, and D. Alpert. 1963, 20p
Contract DA36 039AMC02208E; Grant NSG376
NASA CR-51211
Distribution: No limitation.

Descriptors: (*Ionization gages, Errors).

N65-19269 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
EXPERIMENTALLY MEASURED EFFECTS OF THE WALL BOUNDARY LAYER ON SHOCK-TUBE PERFORMANCE,
by F. R. Livingston. 1 Mar 65, 21p JPL-TR-32-714
Contract NAS7100
NASA CR-57266
Distribution: No limitation.

Descriptors: (*Shock tubes, Performance (Engineering)), (*Boundary layer, Shock tubes).

N65-22182 **Field 14B**
CFSTI Prices: HC$2.00 MF$0.50
Langley Research Center, Langley Station, Va.
THE EVALUATION OF SEVERAL COMMERCIALLY AVAILABLE ACCELEROMETERS,
by Tom D. Finley. 1964, 27p
NASA TM-X-51791
Presented at the I.R.I.G. 4th Transducer Workshop, Wright-Patterson AFB, Ohio, 18-19 Jun 64.
Distribution: No limitation.

Descriptors: (*Accelerometers, Performance (Engineering)), Calibration.

N65-25244 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
National Bureau of Standards, Boulder, Colo.
AVAILABLE LOW-TEMPERATURE THERMOCOUPLE INFORMATION AND SERVICES,
by L. L. Sparks and R. L. Powell. 15 Feb 65, 20p NBS-8750
Proj. 31503 12 3150532
NASA CR-63149
Distribution: No limitation.

Descriptors: (*Thermocouples, Low-temperature research), (*Cryogenics, Thermocouples).

N65-26024 **Field 14B**
CFSTI Prices: HC$2.00 MF$0.50
Maryland Univ., College Park. Inst. for Fluid Dynamics and Applied Mathematics.
DEVELOPMENT OF A SPECTROSCOPIC SHOCK TUBE,
by M. H. Miller and T. D. Wilkerson. Apr 64, 48p BN 353
Grants NsG359, AF AFOSR141 63
NASA CR-63379
Distribution: No limitation.

Descriptors: (*Shock tubes, Spectroscopy), (*Spectroscopy, Shock tubes).

N65-31135 **Field 14B, 5A, 20K, 6C, +**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Washington, D. C.
INDEX TO NASA TECH BRIEFS. ISSUE NUMBER 2.
Aug 65, 45p
NASA SP-5021 (01)
Distribution: No limitation.

Descriptors: (*Indexes, Scientific research), Abstracts, Space ; light, Electronics, Mechanics, Biology, Reports.

N65-31138 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Polytechnic Inst. of Brooklyn, Farmingdale, N. Y.
ACCELERATION COMPENSATED LOW LEVEL PRESSURE TRANSDUCER,
by Samuel Lederman and Marian Visich, Jr. Aug 65, 27p
Grant NsG409
NASA CR-286
Distribution: No limitation.

Descriptors: (*Pressure, Measurement), (*Transducers, Pressure), Monitors, Shock tubes, Instrumentation.

ORNL-P-1465 **Field 14B, 18D**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
AN UNCONVENTIONAL ULTRA-HIGH VACUUM FACILITY,
by C. F. Barnett and J. A. Ray. 1965, 7p
CONF-65-0512-5
Contract W-7405-eng-26
Presented at Symposium on Engineering Problems of Controlled Thermonuclear Research, Livermore, Calif. Distribution: No limitation.

Descriptors: (*Vacuum apparatus, Nuclear reactions).

Patent 3,209,249 **Field 14B, 21I**
METHOD OF INDICATING THERMAL STABILITY OF BULK POLYMERS.
Patent assigned to Navy,
by Robert W. Warfield. 28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Test methods, Polymers), (*Polymers, Thermal stability), (*Thermal stability, Solid rocket propellants), Measurement, Solid rocket propellants binders, Resistance (Electrical), Patents.

The method is for indicating the thermal stability of bulk polymers, propellants and propellant binders. Typical bulk polymers are epoxylated-novolac resins, fluorinated hydrocarbon resins, silicone resins and polyurethane and polyepoxide resins. Thermal stability is determined by the measurement of the electrical resistivity under conditions of pyrolysis.

Patent 3,210,852 **Field 14B**
UNILINEAR DISPLACEMENT MEASURING APPARATUS.
Patent assigned to AEC,
by Howard V. Herndon. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Dilatometers, Analog systems), Shafts, Rotation, Counting methods, Patents.

The apparatus measures a small displacement due to dimensional changes of an object. In the apparatus, rotating shaft reciprocates a part, the part in reciprocating angularly shifts to rotate and move axially one of a set of threaded members, another of the set is moved axially an amount equal to the displacement to be measured, and a counter indicates the rotations of the shaft as a measure of the displacement. Significant features of the present invention are that the reciprocating part reciprocates many times to produce a single rotation of the one threaded member and that the latter has many times the axial movement of the other threaded member.

Patent 3,211,433 **Field 14B**
MAGNETIC STIRRING APPARATUS.
Patent assigned to Army,
by Joseph E. Chrostowski, Sigmund Berk and Louis R.Celli. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Laboratory equipment, Mixtures), (*Explosive materials, Laboratory equipment), Liquids, Magnets, Rotation, Patents.

Identifiers: Stirring.

The apparatus is utilized for stirring liquids of a flammable, explosive or highly volatile nature in a closed system. A magnetized impeller or driven element is put into a glass stoppered bottle with the chemical. The element is agitated by a driving assembly or permanent magnet bar which is rotated by a stream of compressed gas.

Patent 3,212,325 **Field 14B, 16D, 22B**
FORCE MEASURING INSTRUMENT.
Patent assigned to NASA,
by Lester Katz and Jack J. Nichols. 19 Oct 65

Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Guided missile components, Bolts), (*Bolts, Strain (Mechanics)), (*Force (Mechanics), Measurement), Loading (Mechanics), Stresses, Studs, Spacecraft components, Torque, Patents.

The instrument senses strain and indicates load or stress in a bolt or stud used in the construction of missiles and space vehicles. Part of the instrument, a plunger, is positioned in an axial blind hole formed through the head of the bolt and through part of its length. Torque applied to the bolt effects the plunger position which plunger movement is transmitted to an indicator.

PB-168 642 **Field 14B, 7B, 7C**
CFSTI Prices: HC$1.00 MF$0.50
Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
GAS CHROMATOGRAPHY, A REPORT BIBLIOGRAPHY.
Oct 65, 16p
CFSTI RB-5 canceled
Distribution: No limitation.

Descriptors: (*Gas chromatography, Bibliographies), (*Bibliographies, Gas chromatography), Chromatographic analysis, Abstracts.

A bibliography is given of AD- series reports aquired, and offered for public sale, by CFSTI since 1961. An abstract is included with each of the 56 entries.

PWAC-454 **Field 14B**
CFSTI Prices: HC$2.00 MF$0.50
Pratt and Whitney Aircraft, Middletown, Conn. Aircraft Nuclear Engine Lab.
DRIFT AND ENDURANCE TESTING OF CHROMEL/ ALUMEL, W-5 RE/W-26 RE AND MO/W-26 RE THERMOCOUPLES AT 1950F TO 2000F FOR 10,000 HOURS,
by Salvatore Fanciullo. 23 Feb 65, 37p
Contract AT (30-1)-2789
Distribution: No limitation.

Descriptors: (*Thermocouples, Heat-resistant metals + alloys), (*Heat-resistant metals + alloys, Thermocouples).

SC-RR-65-325 **Field 14B, 20L**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
APPARATUS FOR THE MEASUREMENT OF THE HALL EFFECT IN METALS,
by R. C. Heckman. Aug 65, 17p
Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Test equipment, Hall effect), (*Hall effect, Metals).

SCL-DR-64-131 **Field 14C**
CFSTI Prices: HC$2.00 MF$0.75
Sandia Corp., Albuquerque, N. Mex.
CARRIER-ERASE RECORDING SYSTEM.
Development rept.,
by J. F. Barham. Mar 65, 61p
Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Magnetic recording systems, Theory).

UCRL-11200 Vol. 2 **Field 14B, 20H, 13M, 20G, +**
CFSTI Prices: HC$5.00 MF$1.75
Lawrence Radiation Lab., Univ. of California, Berkeley.
INDEX OF LRL BERKELEY MECHANICAL ENGINEERING DEPARTMENT ENGINEERING NOTES AND SPECIFICATIONS. VOLUME 2,
by James O. Turner. Apr 65, 186p
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Mechanical engineering, Nuclear physics), (*Indexes, Mechanical engineering).

UCRL-7894 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
PORTABLE BATTERY-OPERATED HIGH-VOLUME AIR SAMPLER,
by C. L. Lindeken and R. D. Taylor. 10 Jun 64, 13p
Contract W-7405eng-48
Distribution: No limitation.

Descriptors: (*Samplers, Air), (*Air, Samplers), Portable.

Y-KE-179 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.
NUMERICALLY CONTROLLED GAGING,
by T. E. Douglass. 4 Mar 65, 14p CONF-650307-1
Contract W-7405-eng-26
Prepared for presentation at American Ordnance Assn. Meeting, Philadelphia, Pa., 17-18 Mar 1965.
Distribution: No limitation.

Descriptors: (*Test equipment, Design).

15. MILITARY SCIENCES

ORNL-TM-1154 **Field 15B, 13A**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
MANUAL SHELTER-VENTILATING DEVICES FOR CROWDED SHELTERS COOLED BY OUTSIDE AIR.
Preliminary rept.,
by Cresson H. Kearny. 8 Jun 65, 14p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Shelters, Cooling + ventilating equipment), (*Cooling + ventilating equipment, Shelters).

Patent Design 201,684 **Field 15E**
ARMED FORCES EXPEDITIONARY SERVICE MEDAL.
Patent assigned to Army,
by Jay C. Morris. 20 Jul 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Awards, Armed forces (United States)), Design, Patents.

The front of the armed forces expeditionary service medal features a star upon which is superimposed an eagle with spread wings perched on a sheathed sword. ARMED FORCES EXPEDITIONARY SERVICE is inscribed on the front of the medal. The rear of the medal carries the words UNITED STATES OF AMERICA, a shield and olive branches.

Patent 3,208,082 **Field 15E**
CONCEALED SEALING FLAP FOR OPENINGS.
Patent assigned to Army,
by Mario Di Paolo. 28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Clothing, Design), Patents.

The concealed sealing flap is for garments having a fly or placket defined opening. It makes the fly of a pair of trousers dust and vessicant proof. It is concealed in use. The flap is used with a buttoned fly. In use one section of the flap is buttoned onto a fly, the fly is buttoned and another section of the flap is buttoned onto the trouser's fly.

PB-168 638 **Field 15C**
CFSTI Prices: HC$3.00 MF$0.75
Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
CIVIL DEFENSE; A REPORT BIBLIOGRAPHY.
May 65, 88p
CFSTI RB-1 canceled
Distribution: No limitation.

Descriptors: (*Civil defense systems, Bibliographies), Radioactive fallout, Radiological contamination, Radiation hazards, Radiation monitors, Shelters, Civil defense personnel, Training, Health physics, Decontamination, Nuclear warfare casualties, Nuclear explosion damage, Fire safety, Survival, Biological warfare, Chemical warfare, Warning systems, Urban planning, Communication systems, Air traffic control systems, Command + control systems, Cold war, Deterrence, Fire safety, Medical personnel, Public opinion, Information retrieval, Costs.

The bibliography is in the area of civil defense. Its purpose is to present to those in the field of civil defense an indication of the current reports available to them through the Clearinghouse.

16. MISSILE TECHNOLOGY

N65-28202 **Field 16D, 19D**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
THE WIND-INDUCED LOADS ON A DYNAMICALLY SCALED MODEL OF A LARGE MISSILE IN LAUNCHING POSITION,
by Donald A. Buell and George C. Kenyon. Dec 59, 36p Rept. no. TMX-109
Distribution: No limitation.

Descriptors: (*Guided missiles, Aerodynamic loading), (*Exterior ballistics, Guided missiles).

17. NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

N65-17532 **Field 17B**
CFSTI Prices: HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
DESCRIPTION AND FLIGHT ANALYSIS OF THE RANGER VII TV SUBSYSTEM,
by M. A. Benson and R. D. Williams. 15 Feb 65, 23p JPL-TR-32-680
Contract NAS7 100
NASA CR-60820
Distribution: No limitation.

Descriptors: (*Space communication systems, Television communication systems), (*Television communication systems, Space communication systems).

N65-19930 **Field 17B, 22B**
CFSTI Prices: HC$4.00 MF$0.75
General Precision, Inc., Glendale, Calif. Librascope Group.
STUDY ON SPEECH COMPRESSION FOR MANNED SPACE VEHICLES.
Final technical rept.
20 Mar 64, 118p
Contract NASw700
NASA CR-57405
Microfilmed from best available copy. Distribution: No limitation.

Descriptors: (*Speech compression, Manned spacecraft), (*Manned spacecraft, Speech compression).

N65-24719 **Field 17B, 9C**
CFSTI Prices: HC$3.00 MF$0.75
Spacelabs, Inc. Van Nuys, Calif.
WIRELESS EAR MICROPHONE INTERCOMMUNICATION SYSTEM.
Final Report.
16 Apr 65, 64p SR65-1012
Contract NAS9-2777
NASA CR-65021
Distribution: No limitation.

Descriptors: (*Earphones, Radio communication systems), (*Radio communication systems, Electroacoustic transducers), (*Microphones, Radio communication systems).

N65-26146 **Field 17B, 22B**
CFSTI Prices: HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
MARINER MARS 1964 TELEMETRY AND COMMAND SYSTEM.
by Richard P. Mathison. 1 Jun 65, 27p JPL-TR-32-684
Contract NAS7 100
NASA CR-63289
Distribution: No limitation.

Descriptors: (*Space communication systems, Mars probes), (*Telemeter systems, Command + control systems).

N65-27821 **Field 17B, 9C, 22A**
CFSTI Price: MF$2.50
International Business Machine Corp., Rockville, Md. Federal Systems Div.
SPACE COMMUNICATIONS: THEORY AND APPLICATIONS. VOLUME I: MODULATION AND CHANNELS A BIBLIOGRAPHY,
by Richard F. Filipowsky and Louise C. Bickford. Jun 65, 486p
NASA SP-7022 (01), Vol 1
Hardcopy available from Superintent of Documents, GPO, Washington, D. C., 20402, $2.50.
Distribution: No limitation.

Descriptors: (*Space communication systems, Bibliographies), (*Modulation, Space communication systems).

N65-29846 **Field 17B, 9D, 22A**
CFSTI Prices: MF$2.25
International Business Machine Corp., Rockville, Md. Federal Systems Div.
SPACE COMMUNICATIONS: THEORY AND APPLICATIONS. VOL. 2: CODING AND DETECTION THEORY BIBLIOGRAPHY, 1958-1963,
by Richard F. Filipowsky and Louise C. Bickford. Jun 65, 426p
NASA SP-7022 (02)
Hardcopy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $2.25.
Distribution: No limitation.

Descriptors: (*Space communication systems, Bibliographies), (*Communication theory, Space communication systems).

N65-31136 **Field 17B, 9B, 22A**
CFSTI Prices: MF$2.25
International Business Machines Corp., Rockville, Md. Federal Systems Div.
SPACE COMMUNICATIONS: THEORY AND APPLICATIONS. VOLUME 3: INFORMATION PROCESSING AND ADVANCED TECHNIQUES. A BIBLIOGRAPHY, 1958-1963,
by Richard F. Filipowsky and Louise C. Bickford. Jul 65, 463p
Contract NASw981
NASA SP-7022 (03)
Hardcopy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $2.50.
Distribution: No limitation.

Descriptors: (*Space communication systems, Bibliographies), (*Data processing systems, Space communication systems).

N65-32187 **Field 17B, 22B, 22A**
CFSTI Prices: MF$1.75
International Business Machines Corp., Rockville, Md. Federal Systems Div.
SPACE COMMUNICATIONS THEORY AND APPLICATIONS. VOLUME 4: SATELLITE AND DEEP SPACE APPLICATIONS. A BIBLIOGRAPHY,
by Richard F. Filipowsky and Louise C. Bickford. Jul 65, 303p
Contract NASw981
NASA SP-7022 (04) Vol. 4
Hardcopy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $1.75.
Distribution: No limitation.

Descriptors: (*Space communication systems, Bibliographies), (*Satellites (Artificial), Space communication systems).

N65-32399 **Field 17G, 20F**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration. Moffett Field, Calif., Ames Research Center.
IMAGE DISSECTOR APERTURE GEOMETRIES AND SCAN PATTERNS FOR USE IN STAR TRACKER SYSTEMS,
by Fred H. Shigemoto and Bruce H. Dishman. Sep 65, 34p
NASA TND-2990
Distribution: No limitation.

Descriptors: (*Image tubes, Star trackers), (*Star trackers, Electron optics).

Patent 3,212,053 **Field 17A**
SONAR SYSTEM.
Patent assigned to Naval Research Laboratory,
by William J. Finney. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Sonar, Design), Underwater sound equipment, Patents.

The pulse echo signal system includes an impulse transmitter system for transmitting to remote

objects a group of time spaced pulses, each having distinct frequency characteristics and a receiver operable to receive the signals after reflection from the objects. The reflected signals are separated in the receiver in accordance with their respective distinct frequency characteristics. These separated signals are delayed and combined into a composite signal which is fed to an indicator.

Patent 3,212,437 **Field 17A**
EXPLOSIVE SOUND SOURCE FOR UNDER WATER ECHO RANGING TECHNIQUES.
Patent assigned to Navy,
by Donald M. Saling. 19 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Echo ranging, Underwater equipment), Underwater sound generators, Underwater explosions, Buoys, Patents.

The explosive sound source is especially suitable for underwater echo ranging techniques in which the sound waves spread in a predominantly horizontal plane. Aine charge is suspended from a buoy by a cable. The other end of the line charge has a weight attached to it. A primer is attached to the midsection of the line charge with ignition devices positioned in the buoy.

Patent 3,213,448 **Field 17I**
FOUR-DIMENSIONAL ACQUISITION DISPLAY.
Patent assigned to Navy,
by Thomas P. Foley. 19 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Target acquisition, Display systems), (*Display systems, Doppler radar), Radar tracking, Radar equipment, Cathode ray tube screens, Range finding, Azimuth, Radar duplexers, Patents.

The phased-array Doppler radar system includes a phased-array Doppler system having a radar synchronizer and a programmer, a binary storage device, a display storage programmer and a cathode ray display tube.

Patent 3,215,904 **Field 17F, 19H**
MINE COUNTER MEASURE SHIPS DEGAUSSING STATUS INDICATOR.
Patent assigned to Navy,
by Wayne E. Burt. 2 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Monitors, Magnetic fields), (*Mines (Ordnance), Magnetometers), Degaussing, Countermeasures, Patents.

The shipboard system is for monitoring the magnetic signature of a ship and automatically controlling the degaussed condition. The system includes an array of magnetic field using sensing devices located at various monitoring points, an optimum standard for comparison purposes, and components for comparing actual values with the standard. From this equipment the degaussed condition of the ship may be monitored continuously.

Patent 3,216,014 **Field 17I**
DOPPLER RADAR TARGET SIMULATOR.
Patent assigned to Army,
by John L. Kerr. 2 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Radar target position simulators, Doppler radar), Patents, Waveguides.

The radar target simulator includes an annular hollow waveguide split midway along a transverse plane. One hollow waveguide section is stationary and the other waveguide section is rotated relative to it. Waveguide elements are affixed to the stationary split waveguide section for coupling RF energy into and out of the annular hollow waveguide.

18. NUCLEAR SCIENCE AND TECHNOLOGY

AGN-TM-407 **Field 18K, 7D**
CFSTI Prices: HC$3.00 MF$1.00
Aerojet-General Nucleonics, San Ramon, Calif.
ARMY GAS-COOLED REACTOR SYSTEMS PROGRAM. AGN-GAM, AN IBM 7090 CODE TO CALCULATE SPECTRA AND MULTIGROUP CONSTANTS,
by T. P. Wilcox and S. T. Perkins. Apr 65, 151p
Contract AT (10-1)-880
Distribution: No limitation.

Descriptors: (*Gas-cooled reactors, Programming (Computers)), (*Programming (Computers), Gas-cooled reactors), (*Spectroscopy, Programming (Computers)).

ANL-6990 **Field 18I, 18K, 18M**
CFSTI Prices: HC$10.00 MF$2.75
Argonne National Lab., Ill.
A MANUAL OF REACTOR LABORATORY EXPERIMENTS,
by D. A. Daavettila, W. F. Gilbert, L. L. Lawyer, W. J. Sturm, and K. C. Ruzick. Jan 65, 687p
Contract W-31-109-eng-38
Distribution: No limitation.

Descriptors: (*Instruction manuals, Reactor operation), (*Reactor operation, Training).

ANL-6590 **Field 18K**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
SPECTRAL REPRESENTATION AND CRITICALITY PROBLEM OF A TWO-REGION CELL TRANSPORT OPERATOR,
by Israel Pollack and Erwin Bareiss. Mar 65, 41p

Contract W-31-109-eng-33
Distribution: No limitation.

Descriptors: (*Neutron transport properties, Operators (Mathematics)), (*Critical assemblies, Neutron transport theories).

ANL-6735 **Field 18I, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
FUEL MANAGEMENT AND INVENTORY IN THE EBR-II FUEL CYCLE,
by I. G. Dillon, L. Burris, Jr., and M. Levenson. Mar 65, 19p
Contract W-31-109-eng-38
Distribution: No limitation.

Descriptors: (*Reactor fuels, Breeder reactors), (*Breeder reactors, Reactor operation).

ANL-6751 **Field 18I, 18K**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
NEUTRON-FLUX STUDIES IN THE EBWR DURING POWER OPERATION,
by W. G. Knapp. Mar 65, 30p
Contract W-31-109-eng-38
Distribution: No limitation.

Descriptors: (*Neutron flux, Boiling water reactors), (*Boiling water reactors, Power reactors).

ANL-6949 **Field 18D**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
THEORETICAL ESTIMATES OF PILE-UP DISTORTION,
by Raymond Gold. Mar 65, 40p
Contract W-31-109-eng-38
Distribution: No limitation.

Descriptors: (*Radiation measurement systems, Errors).

ANL-6961 **Field 18L, 18J**
CFSTI Prices: HC$5.00 MF$1.00
Argonne National Lab., Ill.
EXPERIMENTS WITH CENTRAL SUPERHEATER CORE CSH-1, BORAX-V.
Jan 65, 151p
Contract W-31-109-eng-38
Distribution: No limitation.

Descriptors: (*Reactor cores, Boiling water reactors), (*Boiling water reactors, Reactor cores).

ANL-6995 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
THE MANUFACTURE OF GLASS-BONDED FUELS FOR DOPPLER COEFFICIENT MEASUREMENT,
by J. E. Ayer, A. G. Hins, D. E. White, D. C. Carpenter, and C. F. Konicek. Mar 65, 51p
Contract W-31-109-eng-38
Distribution: No limitation.

Descriptors: (*Reactor fuels, Manufacturing methods).

ANL-7008 **Field 18J, 7F, 11B**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
INVESTIGATION OF FUSED-SALT PROCESSES FOR THE PREPARATION OF URANIUM SULFIDES,
by D. R. Messier. Mar 65, 12p
Contract W-31-109-eng-38
Distribution: No limitation.

Descriptors: (*Uranium compounds, Sulfides).

Identifiers: Uranium sulfides.

ANL-7009 **Field 18I, 9B**
CFSTI Prices: HC$4.00 MF$1.00
Argonne National Lab., Ill.
A FEASIBILITY STUDY OF THE APPLICATION OF A DIGITAL DATA ACQUISITION AND PROCESS CONTROL SYSTEM TO A RESEARCH REACTOR,
by G. C. Vellender. Jan 65, 132p
Contract W-31-109-eng-38
Distribution: No limitation.

Descriptors: (*Research reactors, Digital systems).

ANL-7014 **Field 18K, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
AN ANALYSIS OF SIX AETR FAST CRITICAL EXPERIMENTS,
by William G. Davey. Mar 65, 23p
Contract W-31-109-eng-38
Distribution: No limitation.

Descriptors: (*Critical assemblies, Fast reactors), (*Thermal reactors, Thorium).

ANL-7019 **Field 18K, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
SOME PHYSICS ASPECTS OF THE PLUTONIUM EXPERIMENT IN EBWR,
by B. J. Toppel and R. Avery. Apr 65, 38p
Contract W-31-109-eng-38
Distribution: No limitation.

Descriptors: (*Boiling water reactors, Plutonium), (*Reactor fuels, Thermal reactors).

ANL-7046 **Field 18I, 18J, 18K. 7A, 10B**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
REACTOR DEVELOPMENT PROGRAM.
Progress rept.
May 65, 94p
Contract W-31-109-eng-38
Distribution: No limitation.

Descriptors: (*Liquid metal cooled reactors, Research reactors), (*Reactor operation, Liquid metal cooled reactors).

ANL-7071 **Field 18I, 18J, 18K, 7A,2**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
REACTOR DEVELOPMENT PROGRAM.
Progress rept. for June 65.
30 Jul 65, 78p
Contract W-31-109-eng-38
Distribution: No limitation.

Descriptors: (*Liquid metal cooled reactors, Research reactors), (*Reactor operation, Liquid metal cooled reactors).

AP-NOTE-441 **Field 18K**
CFSTI Prices: HC$1.00 MF$0.50
Alco Products, Inc., Schenectady, N. Y. Nuclear Power Engineering Dept.
PRELIMINARY INVESTIGATION OF DEPENDENCE OF TEMPERATURE COEFFICIENT OF REACTIVITY ON REACTOR CONFIGURATION,
by R. L. Murray. 20 Jun 62, 14p
Contract AT (30-1)-2639
Prepared in cooperation with North Carolina State College. Distribution: No limitation.

Descriptors: (*Reactor reactivity, Configuration), (*Temperature coefficient of reactivity, Configuration).

AP-NOTE-443 **Field 18J**
CFSTI Prices: HC$1.00 MF$0.50
Alco Products, Inc., Schenectady, N. Y. Nuclear Power Engineering Dept.
COMPARISON OF UNIFORM AND NON-UNIFORM DEPLETION IN REACTOR CORES WITH BURNABLE POISON,
by Raymond L. Murray. 5 Jul 62, 24p
Contract AT (30-1)-2639
Distribution: No limitation.

Descriptors: (*Reactor cores, Reactor poisons), (*Reactor poisons, Reactor cores).

BMI-1721 (Del.) **Field 18J, 11F, 7E, 18B**
CFSTI Prices: HC$1.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING MARCH 1965,
by Russell W. Dayton and Stan J. Paprocki. 1 Apr 65, 46p
Contract W-7405-eng-92
Distribution: No limitation.

Descriptors: (*Nuclear industrial application, Reports), (*Nuclear reactors, Scientific research), Reactor materials, Radioactive isotopes.

BMI-1723 (Del.) **Field 18J, 18B**
CFSTI Prices: HC$1.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING APRIL 1965,
by Russell W. Dayton and Stan J. Paprocki. 1 May 65, 44p
Contract W-7405-eng-92
Distribution: No limitation.

Descriptors: (*Nuclear industrial applications, Reports), (*Nuclear reactors, Scientific research), Reactor materials, Radioactive isotopes.

BMI-1734 **Field 18J, 18H**
CFSTI Prices: HC$1.25 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
POSTIRRADIATION FISSION-PRODUCT RELEASE FROM COATED FUEL PARTICLES,
by Harvey S. Rosenberg, David L. Morrison, Charles W. Townley, and Duane N. Sunderman.
7 Jul 65, 52p
Contract W-7405-eng-92
Distribution: No limitation.

Descriptors: (*Reactor fuels, Fission products), (*Fission products, Reactor fuels).

BMI-1739 **Field 18J, 18H**
CFSTI Prices: HC$0.75 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
EFFECTS OF LOW-TEMPERATURE IRRADIATION AND SUBSEQUENT ANNEALING ON THE THERMAL DIFFUSIVITY OF PYROLYTIC CARBON AND PYROLYTIC GRAPHITE,
by Webster D. Wood, Herbert W. Deem, and William H. Goldthwaite. 3 Aug 65, 26p
Contract W-7405-eng-92
Distribution: No limitation.

Descriptors: (*Pyrolytic graphite, Radiation damage), Thermal diffusion, Carbon.

BNL-900 **Field 18I, 7E, 18B, 18H,2**
CFSTI Prices: HC$6.00 MF$1.25
Brookhaven National Lab., Upton, N. Y.
NUCLEAR ENGINEERING DEPARTMENT.
Annual rept. for 31 Dec 64.
1965, 213p BNL-S-67
Contract AT-30-2-GEN-16
Distribution: No limitation.

Descriptors: (*Nuclear engineering, Reports), (*Physics laboratories, Nuclear engineering).

BNL-9173 **Field 18B, 18G**
CFSTI Prices: HC$1.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
CHEMICAL REACTIONS AND TRANSPORT BEHAVIOR OF FISSION-PRODUCT IODINE,
by A. W. Castleman, Jr., I. N. Tang, and H. R. Munkelwitz. Apr 65, 24p CONF-650407-2
Contract AT-30-2-GEN-16
Presented at International Symposium on Fission Product Release and Transport under Accident Conditions, Oak Ridge, Tenn., 5-7 Apr 1965. Distribution: No limitation.

Descriptors: (*Radioactive isotopes, Iodine), (*Health physics, Radioactive isotopes), (*Fission products, Iodine).

BNWL-101 **Field 18G, 7A, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
TESTING OF IMMERSION HEATERS FOR IN-TANK SOLIDIFICATION CIRCULATORS,
by J. Dunn. Jul 65, 15p
Contract AT (45-1)-1830
Distribution: No limitation.

Descriptors: (*Radioactivity waste, Processing), (*Heating elements, Radioactivity waste).

BNWL-35 **Field 18K, 9B**
CFSTI Prices: HC$3.00 MF$0.75
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
GAMTEC II: A CODE FOR GENERATING CONSISTENT MULTIGROUP CONSTANTS UTILIZED IN DIFFUSION AND TRANSPORT THEORY CALCULATIONS,
by L. L. Carter, C. R. Richey, and C. E. Hughey.
Mar 65, 78p
Contract AT (45-1)-1830
Distribution: No limitation.

Descriptors: (*Neutron transport theory, Programming (Computers)).

Identifiers: GAMTEC

BNWL-56 **Field 18J**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
TEST FOR MONITORING DIMENSIONAL CHANGES OF GRAPHITE IN ROD CHANNEL 74 AT N-REACTOR,
by B. A. Ryan. Apr 65, 15p
Contract AT (45-1)-1830
Distribution: No limitation.

Descriptors: (*Graphite, Radiation damage), (*Radiation damage, Graphite).

BNWL-58 **Field 18G, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
FISSION PRODUCT DISTRIBUTION IN IRRADIATED UO2,
by J. L. Bates. Mar 65, 26p
Contract AT (45-1)-1830
Distribution: No limitation.

Descriptors: (*Fission products, Reactor fuel elements), (*Reactor fuel elements, Fission product poisoning), UC-25.

BNWL-63 **Field 18G, 8H**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
A SEQUENCE FOR PREDICTING WASTE TRANSPORT BY GROUND WATER,
by R. W. Nelson. 15 Apr 65, 12p
Contract AT (45-1)-1830
Distribution: No limitation.

Descriptors: (*Disposal, Radioactive waste), (*Hydrology, Disposal).

BNWL-64 **Field 18D, 18I**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
BORON-11 NEUTRON FLUX MONITORS.
Interim rept.,
by W. L. Bunch and M. R. Wood. Apr 65, 16p

Contract AT (45-1)-1830
Distribution: No limitation.

Descriptors: (*Neutro flux, Neutron counters), (*Neutron counters, Neutron flux), Boron, Reactor control.

BNWL-76 **Field 18G**
CFSTI Prices: HC$3.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
RESEARCH AND DEVELOPMENT ACTIVITIES FIXATION OF RADIOACTIVE RESIDUES.
Quarterly progress rept. Jan-Mar 65,
ed. by A. M. Platt. Apr 65, 43p
Contract AT (45-1)-1830
Distribution: No limitation.

Descriptors: (*Radioactivity waste, Processing), (*Disposal, Radioactivity waste).

BNWL-77 **Field 18H**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
THE CALCULATION OF PRECIPITATION SCAVENGING,
by R. J. Engelmann. Jul 65, 36p
Contract AT (45-1)-1830
Distribution: No limitation.

Descriptors: (*Radioactive fallout, Mathematical analysis), (*Atmospheric precipitation, Radioactive fallout).

BNWL-81 **Field 18F, 18I**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
LABORATORY EVALUATION OF DECONTAMINATION AGENTS FOR INCONEL PIPING CONNECTORS,
by V. F. Fitzpatrick and R. B. Richman. Jul 65, 8p
Contract AT (45-1)-1830
Distribution: No limitation.

Descriptors: (*Reactor system components, Decontamination), (*Decontamination, Reactor system components).

BNWL-92 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
ENVIRONMENTAL TESTS OF CANDIDATE MATERIALS FOR THE HIGH TEMPERATURE LATTICE TEST REACTOR,
by D. P. O'Keefe. Jul 65, 26p
Contract AT (45-1)-1830
Distribution: No limitation.

Descriptors: (*Reactor materials, Heat resistant metals + alloys), (*Heat resistant metals + alloys environmental tests).

BNWL-95 **Field 18H, 18I, 18J, 18K**
CFSTI Prices: HC$3.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
PHYSICS RESEARCH.
Quarterly rept. Jan-Mar 65.
Mar 65, 55p
Contract AT (45-1)-1830
Distribution: No limitation.

Descriptors: (*Nuclear physics, Nuclear engineering), (*Nuclear reactors, Nuclear engineering), Reactor theory.

CEX-62.11 **Field 18H, 6R**
CFSTI Prices: HC$1.25 MF$0.75
Oak Ridge National Lab., Tenn.
DISTRIBUTION OF WEAPONS RADIATION IN JAPANESE RESIDENTIAL STRUCTURES,
by J. S. Cheka, F. W. Sanders, T. D. Jones, and W. H. Shinpaugh. Mar 65, 114p
Distribution: No limitation.

Descriptors: (*Radiation monitors, Japan), (*Radiological contamination, Housing).

CEX-63.11 **Field 18H, 18D**
CFSTI Prices: HC$1.00 MF$0.75
Edgerton, Germeshausen and Grier, Inc., Boston, Mass.
MOBILE RADIOLOGICAL MEASURING UNIT: DESCRIPTION AND OPERATING INFORMATION,
by Z. G. Burson, R. L. Summers, and J. T. Brashears. Feb 65, 60 p
Distribution: No limitation.

Descriptors: (*Radioactive fallout, Radiation measurement systems), (*Radiation measurement systems, Radioactivity).

CNLM-5983 **Field 18N**
CFSTI Prices: HC$2.00 MF$0.50
Pratt and Whitney Aircraft, Middletown, Conn. Aircraft nuclear Engine Lab.
NUCLEAR TEST FACILITY DESIGN.
Interim rept.
30 Nov 64, 30p
Contract AT (30-1)-2789
Distribution: No limitation.

Descriptors: (*Nuclear power plants, Auxiliary power plants).

Identifiers: SNAP-50/SPUR.

CONF-117 **Field 18J**
CFSTI Prices: HC$2.00 MF$1.25
Battelle Memorial Inst., Columbus, Ohio.
PREPARATION AND PROCESSING OF PARTICULATE NUCLEAR FUELS,
ed. by John M. Blocher, Jr. 9 Sep 63, 202p
Contract W-7405-eng-92
Presented at Symposium held at New York, 9 Sep 1963. Distribution: No limitation.

Descriptors: (*Reactor fuels, Symposia), (*Symposia, Reactor fuels).

CONF-650510-14 **Field 18D, 20G**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
INNOVATIONS IN BUBBLE CHAMBER DEVICES,
by E. G. Pewitt. Jun 65, 47p
Contract W-31-109-eng-38
Prepared in cooperation with Carnegie Inst. of Tech., Pittsburgh, Pa. Presented at Purdue Conference on Instrumentation for High Energy Physics, Lafayette, Ind. 11-14 May 1965. Distribution: No limitation.

Descriptors: (*Bubble chambers, Instrumentation).

CONF-650919-2 **Field 18I, 7B, 7A**
CFSTI Prices: HC$1.00 MF$0.50
Du Pont de Nemours (E. I.) and Co., Inc., Aiken, S. C. Savannah River Lab.
AUTOMATED ANALYSES FOR THE CHARACTERIZATION OF HEAVY WATER MODERATOR,
by R. H. Gaddy. 3 Aug 65, 25p
Contract AT (07-2)-1
Presented at Technicon Analytical Symposium, New York. Distribution: No limitation.

Descriptors: (*Heavy water, Chemical analysis), (*Chemical analysis, Automation).

COO-651-4 **Field 18L, 18I**
CFSTI Prices: HC$2.00 MF$0.50
Rural Cooperative Power Association, Elk River, Minn.
ELK RIVER REACTOR.
Monthly operating rept. no. 23, Sep 64.
Sep 65, 36p
Contract AT (11-1)-651
Distribution: No limitation.

Descriptors: (*Power reactors, Operation).

COO-651-5 **Field 18L**
CFSTI Prices: HC$2.00 MF$0.50
Rural Cooperative Power Association, Elk River, Minn.
ELK RIVER REACTOR.
Monthly operating rept no. 24, Oct 64.
Sep 64, 36p
Contract AT (11-1)-651
Distribution: No limitation.

Descriptors: (*Power reactors, Reactor operation), (*Reactor operation, Power reactors).

DP-926 **Field 18D, 9A**
CFSTI Prices: HC$1.00 MF$0.50
Du Pont De Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
A SCRAM BYPASS SYSTEM USING ZENER DIODES AS LOGIC ELEMENTS,
by William J. Woodward. Jun 65, 7p
Contract AT (07-2)-1
Distribution: No limitation.

Descriptors: (*Reactor shutdown, Switching circuits), (*Switching circuits, Computer logic).

DP-965 **Field 18I, 18J, 18L**
CFSTI Prices: HC$2.00 MF$0.50
Du Pont de Nemours (E. I.) and Co., Inc., Aiken, S. C. Savannah River Lab.
HEAVY WATER MODERATED POWER REACTORS.
Progress rept. for Jan-Feb 65,
comp. by R. R. Hood. Mar 65, 27p
Contract AT (07-2)-1
Distribution: No limitation.

Descriptors: (*Heavy water reactors, Power reactors), (*Reactor reaction, Heavy water reactors).

DP-982 **Field 18J**
CFSTI Prices: HC$1.00 MF$0.50
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
SEMIWORKS EVALUATION OF THE MANGANESE DIOXIDE HEAD-END STEP IN THE THOREX PROCESS,
by Albert A. Kishbaugh. Jul 65, 11p
Contract AT (07-2)-1
Distribution: No limitation.

Descriptors: (*Uranium, Purification), (*Protactinum, Sorptium).

Identifiers: Thorex process.

DP-984 **Field 18B, 10B, 18N**
CFSTI Prices: HC$1.00 MF$0.50
Du Pont de Nemours (E. I.) and Co., Inc., Aiken, S. C. Savannah River Lab.
RADIATION PROPERTIES OF 238 Pu PRODUCED FOR ISOTOPIC POWER GENERATORS,
by Dean H. Stoddard and Edward L. Albenesius. Jul 65, 21p
Contract AT (07-2)-1
Distribution: No limitation.

Descriptors: (*Plutonium, Energy conversion), (*Power supplies, Plutonium).

EURAEC-1343 **Field 18H, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Battelle Memorial Inst., Geneva (Switzerland).
THE EFFECT OF RADIATION ON THE DUCTILEBRITTLE TRANSITION IN PRESSURE VESSEL STEELS.
Quarterly rept. no. 16, 1 Oct 64-3 Jan 65,
by E. Anderson, D. G. Brandon, D. Langheirrich, G. T. Hahn, and D. L. King. Feb 65, 35p
EUR-2319
Contract 095-62-12 RDS
Distribution: No limitation.

Descriptors: (*Radiation damage, Steel), (*Steel, Radiation damage), Pressure vessels.

GA-5938 **Field 18I, 18J**
CFSTI Prices: HC$4.00 MF$1.00
General Atomic, San Diego, Calif. John Jay Hopkins Lab. for Pure and Applied Science.
DESIGN, CONSTRUCTION, AND INITIAL OPERATION OF GENERAL ATOMIC IN-PILE LOOP,

797-565 O - 66 - 16

by R. H. Simon. 15 Feb 65, 160p
Contract AT (04-3)-314
Distribution: No limitation.

Descriptors: (*Gas-cooled reactors, Reactor operation), (*Test reactors, Reactor operation).

GEAP-4474 **Field 18J, 18I**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
EXPERIMENTAL AND ANALYTICAL PROGRAM RECOMMENDATIONS. REACTOR PIPE RUPTURE STUDY,
comp. by H. H. Klepfer. Jan 65, 88p
Contract AT (04-3)-189
Distribution: No limitation.

Descriptors: (*Reactor materials, Pipes), (*Pipes, Reactor materials).

GEAP-4572 **Field 18G, 18J**
CFSTI Prices: HC$3.00 MF$0.50
General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
FISSION GAS RELEASE FROM UO2 FUEL RODS WITH GROSS CENTRAL MELTING. I. PELLET FUEL,
by R. C. Nelson, D. H. Coplin, M. F. Lyons, andB. Weidenbaum. 24 Jul 64, 58p EURAEC-1435
Contract AT (04-3)-189
Distribution: No limitation.

Descriptors: (*Reactor fuels, Fission products), (*Fission products, Gases), Reactor fuel rods, Melting, Uranium compounds, Oxides.

GEAP-4574 **Field 18J, 13K**
CFSTI Prices: HC$5.00 MF$1.25
General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
SURVEY OF PIPING FAILURES FOR THE REACTOR PRIMARY COOLANT PIPE RUPTURE STUDY,
comp. by W. S. Gibbons and B. D. Hackney. May 64, 244p
Contract AT (04-3)-189
Distribution: No limitation.

Descriptors: (*Failure (Mechanics), Pipes), (*Pipes, Reactor coolants).

GEAP-4842 **Field 18L, 18I**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
DEVELOPMENT PROGRAM ON THE GARIGLIANO NUCLEAR REACTOR.
Quarterly rept. no. 10,
by C. L. Howard. 1 Apr 65, 30p EURAEC-1373
Contract AT (04-3)-189
Distribution: No limitation.

Descriptors: (*Power reactors, Design).

Identifiers: Garigliano reactor.

GEAP-4845 **Field 18K, 18J, 18B**
CFSTI Prices: HC$1.00 MF$0.50
General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
PLUTONIUM SUBCRITICAL EXPERIMENT PROGRAM.
Quarterly rept no. 3, 1 Jan-31 Mar 65,
by J. G. Carver. 1 Apr 65, 19p EURAEC-1374
Contract AT (04-3)-189
Distribution: No limitation.

Descriptors: (*Plutonium, Subcritical assemblies), (*Reactor fuel rods, Plutonium), Reactor theory.

GEAP-4912 **Field 18I, 18J, 18K**
CFSTI Prices: HC$1.00 MF$0.50
General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
PLUTONIUM SUBCRITICAL EXPERIMENT PROGRAM.
Quarterly rept. no. 4, 1 Apr-30 Jun 65,
by J. G. Carver and M. A. Robkin. 1 Jul 65, 22p EURAEC-1442
Contract AT (04-3)-189
Distribution: No limitation.

Descriptors: (*Plutonium, Subcritical assemblies), (*Reactor physics, Plutonium), Reactor fuels.

GEMP-334A **Field 18J, 18H, 11B**
CFSTI Prices: HC$6.00 MF$1.50
General Electric Co., Cincinnati, Ohio. Nuclear Materials and Propulsion Operation.
HIGH-TEMPERATURE MATERIALS AND REACTOR COMPONENT DEVELOPMENT PROGRAMS. VOLUME I. MATERIALS.
Annual rept. no. 4.
26 Feb 65, 232p N65-20761
Contract AT (40-1)-2847
Distribution: No limitation.

Descriptors: (*Reactor system components, Heatresistant materials), (*Heat-resistant materials, Reactor system components).

GEMP-356 (Informal) **Field 18H**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., Cincinnati, Ohio. Nuclear Materials and Propulsion Operation.
CASCADE AND CLUSTER. COMPUTER PROGRAMS TO SIMULATE RADIATION DAMAGE PROCESSES IN METALS AND ANALYZE THE DISTRIBUTION OF DEFECTS,
by D. G. Besco and N. R. Baumgardt. Apr 65, 52p
Contract AT (40-1)-2847
Distribution: No limitation.

Descriptors: (*Programming (Computers), Radiation damage), (*Radiation damage, Simulation).

GEMP-46A **Field 18J, 11B**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Cincinnati, Ohio. Nuclear Materials and Propulsion Operation.
HIGH-TEMPERATURE MATERIALS PROGRAM.
Progress rept. no. 46, Part A.
15 Apr 65, 31p
Contract AT (40-1)-2847
Distribution: No limitation.

Descriptors: (*Reactor fuel elements, Ceramic materials), (*Reactor materials, Radiation damage).

GEMP-88 **Field 18D**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Cincinnati, Ohio. Nuclear Materials and Propulsion Operation.
REACTOR INSTRUMENTATION AND CONTROL.
Progress rept. no. 88.
28 May 65, 23p
Contract AT (40-1)-2847
Distribution: No limitation.

Descriptors: (*Radiation measurement systems, Reactor control), (*Temperature sensitive elements, Reactor control).

GEMP-90 **Field 18D**
CFSTI Prices: HC$3.00 MF$0.50
General Electric Co., Cincinnati, Ohio. Nuclear Materials and Propulsion Operation.
DEVELOPMENT OF NUCLEAR SENSORS.
Final rept.,
by R. H. Stentz and R. L. Treinen. 25 Jun 65, 49p
Contract AT (40-1)-2847
Distribution: No limitation.

Descriptors: (*Radiation measurement systems, Production), (*Nuclear reactors, Radiation measurement systems).

HASL-161 **Field 18H, 6R**
CFSTI Prices: HC$4.00 MF$1.50
Health and Safety Lab., New York Operations Office (AEC), N. Y.
FALLOUT PROGRAM.
Quarterly summary rept. 1 Mar-1 Jun 65,
by Edward P. Hardy, Jr. and Joseph Rivera. 1 Jul 65, 319p
Distribution: No limitation.

Descriptors: (*Radioactive fallout, Health physics), (*Radiological contamination, Sampling), Atmospheric precipitation.

HN-180 **Field 18D**
CFSTI Prices: HC$6.75 MF$2.75
Holmes and Narver, Inc., Los Angeles, Calif.
A STUDY OF RESEARCH REACTOR OPERATING AND SAFETY EXPERIENCE,
by B. J. Garrick, W. C. Gekler, J. M. Duncan, R. H. Karcher, and B. Shimizu. 12 Jun 64, 675p
Contract AT (04-3)-424
Distribution: No limitation.

Descriptors: (*Reactor safety systems, Operation), Reactor operation.

HW-56028 **Field 18J, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
ULTRASONIC BOND TESTING OF IRRADIATED FUEL ELEMENTS,
by K. P. Bokish. 9 May 58, 11p
Contract W-31-109-eng-52
Distribution: No limitation.

Descriptors: (*Reactor fuels, Bonding), (*Nondestructive tesing, Reactor fuels), Ultrasonic radiation.

HW-61236 Sup 6 Rev **Field 18F, 18I**
CFSTI Prices: HC$2.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
PLUTONIUM RECYCLE TEST REACTOR, FINAL SAFEGUARDS ANALYSIS. SUPPLEMENT 6. REVISED LIMITS: ANALYSIS OF UNIFORMLY-ENRICHED CORE,
by H. E. Hanthorn, W. K. Winegardner, andN. G. Wittenbrock. Dec 64, 29p
Contract AT (45-1)-1350
Distribution: No limitation.

Descriptors: (*Reactor safety systems, Test reactors), (*Enriched fuel reactors, Reactor safety systems).

HW-63084-RD **Field 18K, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
UNIRRADIATED FUEL ELEMENT MELTDOWN IN ZIRCALOY TUBE,
by R. K. Hilliard, H. G. Rieck, and A. J. Scott. 1 Feb 60, 15p
Contract AT (45-1)-1350
Distribution: No limitation.

Descriptors: (*Reactor fuel elements, Melting), (*Zirconium alloys, Pipes).

HW-68387 **Field 18B, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
REMOVAL OF RADIOISOTOPE PARENT MATERIAL BY PRODUCING HIGH PURITY PROCESS WATER,
by R. W. Perkins. 10 Feb 61, 5p
Contract AT (45-1)-1350
Distribution: No limitation.

Descriptors: (*Isotope impurities, Water), (*Reactor materials, Isotope separation).

HW-68600-43 **Field 18J, 6R, 18I, 7E,+**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
PLUTONIUM ABSTRACTS. VOLUME 4, NUMBER 9.
1 Oct 64, 20p
Distribution: No limitation.

Descriptors: (*Plutonium, Abstracting).

HW-71813 **Field 18J, 9B, 18I**
CFSTI Prices: HC$3.00 MF$0.75
Hanford Atomic Products Operation, Richland, Wash.
MINIMIZER: A COMPUTER CODE FOR DETERMINING MINIMUM FUEL COST,
by E. A. Eschbach, D. E. Deonigi, and A. F. McConiga. Dec 64, 83p
Contract AT (45-1)-1350
Distribution: No limitation.

Descriptors: (*Reactor fuels, Costs), (*Programming (Computers), Reactor fuels).

Identifiers: IBM 7090, Minimizer computer code.

HW-74346 **Field 18I**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
NUCLEAR PARAMETERS--PRTR MIXED OXIDE FUEL SAFEGUARDS ANALYSIS,
by R. E. Peterson. 18 Jul 62, 11p
Contract AT (45-1)-1350
Distribution: No limitation.

Descriptors: (*Reactor hazards, Test reactors).

HW-84384 **Field 18J, 18I, 18K**
CFSTI Prices: HC$4.00 MF$0.75
Hanford Atomic Products Operation, Richland, Wash.
RESEARCH AND DEVELOPMENT PROGRAMS EXECUTED FOR THE DIVISION OF REACTOR DEVELOPMENT.
Quarterly progress rept. Jul-Sep 64,
ed. by J. K. Green. Dec 64, 90p
Contract AT (45-1)-1350
Distribution: No limitation.

Descriptors: (*Reactor materials, Scientific research), (*Reactor fuels, Scientific research), (*Reactor operation, Scientific research), Reactor theory.

HW-84573 **Field 18J, 18H, 11F**
CFSTI Prices: HC$5.00 MF$1.00
Hanford Atomic Products Operation, Richland, Wash.
METALLURGY RESEARCH OPERATION.
Quarterly progress rept., for Oct-Dec 64.
15 Jan 65, 155p
Contract AT (45-1)-1350
Distribution: No limitation.

Descriptors: (*Reactor materials, Radiation damage), (*Radiation damage, Reactor materials), (*Corrosion, Reactor materials).

HW-84577 **Field 18G**
CFSTI Prices: HC$3.00 MF$0.75
Hanford Atomic Products Operation, Richland, Wash.
SCINTILLATION PROBE RESULTS: 200 AREA WASTE DISPOSAL SITE MONITORING WELLS,
by J. R. Raymond, and V. L. McGhan. 17 Dec 64, 62p
Contract AT (45-1)-1350
Distribution: No limitation.

Descriptors: (*Radioactive waste, Disposal), (*Probes (Electromagnetic), Scintillation), (*Monitors, Radioactive waste).

HW-84608 **Field 18K, 18I**
CFSTI Prices: HC$3.00 MF$0.75
Hanford Atomic Products Operation, Richland, Wash.
PHYSICS RESEARCH.
Quarterly rept. for Oct-Dec 64.
15 Jun 65, 86p
Contract AT (45-1)-1350
Distribution: No limitation.

Descriptors: (*Nuclear physics, Nuclear engineering), (*Nuclear reactors, Nuclear physics), Reactor theory.

HW-84609 **Field 18J, 18I**
CFSTI Prices: HC$3.00 MF$0.75
Hanford Atomic Products Operation, Richland, Wash.
RESEARCH AND DEVELOPMENT PROGRAMS EXECUTED FOR THE DIVISION OF REACTOR DEVELOPMENT.
Quarterly progress rept. for Oct-Dec 64,
ed. by J. K. Green. Dec 64, 81p
Contract AT (45-1)-1350
Distribution: No limitation.

Descriptors: (*Reactor fuels, Scientific research), (*Nuclear reactors, Reactor theory).

IDO-14656 **Field 18K, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
BURNUP DETERMINATION OF NUCLEAR FUELS.
Annual rept. for 1964,
ed. by W. J. Maeck and J. E. Rein. May 65, 48p

Contract AT (10-1)-205
Distribution: No limitation.

Descriptors: (*Fuel burn up, Determination), (*Reactor fuels, Fuel burn up).

IDO-17054 **Field 18K**
CFSTI Price: HC$3.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
ANALYSIS OF FAST TRANSIENT REACTIVITY EFFECTS IN THE SPERT I WATER-MODERATED, U02-FUELED CORE,
by A. H. Spano and J. E. Houghtaling. May 65, 57p
Contract AT (10-1)-205
Distribution: No limitation.

Descriptors: (*Reactor reactivity, Doppler effect), (*Reactor cores, Reactor kinetics).

IDO-17070 **Field 18I, 18D**
CFSTI Prices: HC$6.00 MF$1.25
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
STEP PROJECT.
Quarterly technical rept. Jan-Mar 64, Apr-Jun 64,
by K. A. Dietz. Jun 65, 218p
Contract AT (10-1)-205
Distribution: No limitation.

Descriptors: (*Reactor safety systems, Aerospace craft), (*Safety, Reactor operation).

Identifiers: STEP (Safety Test Engineering Program), SNAP.

IDO-17088 **Field 18K, 18I**
CFSTI Prices: HC$3.00 MF$0.75
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
REACTOR STABILITY TESTS IN THE SPERT IV FACILITY,
by J. G. Crocker, Z. R. Martinson, R. M. Potenza, and L. A. Stephan. Jul 65, 70p
Contract AT (10-1)-205
Distribution: No limitation.

Descriptors: (*Reactor kinetics, Stability).

IS-1072 **Field 18D, 20H**
CFSTI Price: HC$3.00 MF$0.75
Ames Lab., Iowa.
I. S. U. GUTS SYSTEM FOR KINEMATICAL ANALYSIS OF BUBBLE CHAMBER DATA,
by William J. Kernan, William J. Higby, andIva H. Boessenroth. Nov 64, 81p
Contract W-7405-eng-82
Distribution: No limitation.

Descriptors: (*Bubble chambers, Particle trajectories), (*Least squares method, Particle trajectories).

LA-3168 **Field 18I, 13K**
CFSTI Prices: HC$3.00 MF$0.75
Los Alamos Scientific Lab., Univ. of California, N. Mex.
MULTIREGION THERMAL ANALYSIS OF TUBE BUNDLES WITH MOLTEN REACTOR FUEL IN FREE CONVECTION,
by Roy A. Axford. 15 Sep 64, 78p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Reactor fuels, Liquids), (*Pipes, Thermal analysis), (*Reactor system components, Pipes), Heat flux, Convection (Heat transfer), Liquid metals.

LA-3253 **Field 18A**
CFSTI Prices: HC$4.00 MF$0.75
Los Alamos Scientific Lab., Univ. of California, N. Mex.
REVIEW OF CONTROLLED THERMONUCLEAR RESEARCH AT LOS ALAMOS, 1965.
Apr 65, 107p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Thermonuclear reactions, Control), (*Magnetic pinch, Thermonuclear reactions).

LA-3263 **Field 18K**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
PULSED NEUTRON ANALYSIS IN THE LOS ALAMOS COUPLED REACTOR EXPERIMENT,
by Curtis G. Chezem and Herbert H. Helmick.
16 Mar 65, 17p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Neutron transport theory, Reactor kinetics), (*Reactor kinetics, Neutron transport theory).

LA-3313 **Field 18J, 18I**
CFSTI Price: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
APPLICATION OF MINIATURE INTRINSIC THERMO- COUPLES FOR REACTOR-TRANSIENT DIAGNOSTICS,
by Roderick G. Morrison. 1 May 65, 28p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Thermocouples, Reactor system components).

LA-3336 **Field 18D, 18I**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
HIGH-TEMPERATURE REACTOR CORE THERMOCOUPLE EXPERIMENTS,
by W. R. Prince and W. L. Sibbitt. 30 Apr 65, 21p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Thermocouples, Reactor cores), (*Hightemperature research, Nuclear propulsion, Rocket motors.

N65-17526 **Field 18H, 9A**
CFSTI Price: HC$3.00 MF$0.75
Lockheed-Georgia Co., Marietta. Nuclear Labs.
COMPONENTS IRRADIATION TEST NO. 5HPA-1002 AND IN1616 DIODES, S2N1724 AND 2N2222 TRANSISTORS, 2N511 FLIP FLOP BISTABLE NETWORK, SN522 OPERATIONAL AMPLIFIER.
24 Jul 64, 64p ER-4510
Contract NAS8 5332
NASA CR-60840
Distribution: No limitation.

Descriptors: (*Radiation damage, Electronic equipment), (*Electronic equipment, Radiation damage).

N65-19766 **Field 18D**
CFSTI Prices: HC$1.00 MF$0.50
Southern Methodist Univ., Dallas, Tex.
BASIC RESEARCH IN SEMICONDUCTOR DETECTORDOSIMETER CHARACTERISTICS. AS APPLIED TO THE PROBLEMS OF WHOLE BODY DOSIMETRY.
Informal progress rept.,
by George W. Crawford. Feb 65 3p
Grant NsG708
NASA CR-57300
Distribution: No limitation.

Descriptors: (*Dosimeters, Semiconductor devices).

N65-20794 **Field 18H, 11F, 20L**
CFSTI Prices: HC$3.00 MF$0.50
Lockheed Georgia Co., Marietta.
EFFECT OF NUCLEAR RADIATION ON MATERIALS AT CRYOGENIC TEMPERATURES.
Quarterly progress rept. No. 10, Oct-Dec 64,
by C. A. Schwanbeck. 26 Jan 65, 57p ER-7702
Contract NASw114
NASA CR-57750
Distribution: No limitation.

Descriptors: (*Aluminum alloys, Radiation damage), (*Steel, Radiation damage), (*Radiation damage, Cryogenics).

N65-25409 **Field 18N, 18F**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
SNAP-8 CORROSION PROGRAM.
Quarterly progress rept. for period ending 28 Feb 65,
by H. W. Savage, E. L. Compere, W. R. Huntley, R. E. MacPherson, and A. Taboada. Jun 65, 44p ORNL-3823
NASA Order C220A
NASA CR-63196
Distribution: No limitation.

Descriptors: (*Power reactors, Corrosion), (*Fused salts cooled reactors, Corrosion).

Identifiers: SNAP.

NAA-SR-10006 **Field 18I, 14E**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
DEVELOPMENT OF SPECIAL VIEWING AND PHOTOGRAPHIC EQUIPMENT FOR THE SRE REACTOR CORE,
by E. R. Meise. 15 Jun 65, 28p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Reactor operation, Photographic techniques), (*Photographic techniques, Reactor operation).

NAA-SR-10100 **Field 18I, 13M**
CFSTI Prices: HC$7.53 MF$2.00
Atomics International, Canoga Park, Calif.
CONVENTIONAL BUILDINGS FOR REACTOR CONTAINMENT.
25 Jul 65, 453p
Contract AT-11-1-GEN-8
Distribution: No limitation.

Descriptors: (*Buildings, Nuclear reactors), (*Nuclear reactors, Buildings), Gas leaks.

NAA-SR-10612 **Field 18H, 20H**
CFSTI Prices: HC$1.00 MF$0.50
Atomics International, Canoga Park, Calif.
RADIATION DAMAGE IN SILICON: NEUTRON SPECTRUM CONSIDERATIONS,
by M. N. Robinson. 10 Jun 65, 18p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Radiation damage, Silicon), (*Neutron spectrum, Radiation damage).

NAA-SR-10621 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
THE PROPERTIES AND IRRADIATION BEHAVIOR OF U3Si2,
by N. Shimizu. 25 Jul 65, 46p
Distribution: No limitation.

Descriptors: (*Uranium compounds, Reactor fuels), (*Silicides, Reactor fuels).

Identifiers: Uranium silicides.

NAA-SR-10717 **Field 18N**
CFSTI Prices: HC$3.00 MF$0.75
Atomics International, Canoga Park, Calif.
IRRADIATION OF SNAP-10A CONTROL DRUM DRIVE ACTUATORS AND POSITION SENSORS,
by M. Warren. 15 May 65, 62p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Auxiliary power plants, Reactor control), (*Reactor control, Radiation damage).

NAA-SR-10737 **Field 18J, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
ELECTROLYSIS OF URANIUM CARBIDE IN FUSED SALT USING MOLTEN METAL CATHODES,
by M. L. Iverson and R. J. Sullivan. 30 Jun 65, 22p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Uranium compounds, Carbides), (*Reactor fuels, Electrolysis).

Identifiers: Uranium carbides.

NAA-SR-10743 **Field 18I, 18L**
CFSTI Prices: HC$5.00 MF$1.00
Atomics International, Canoga Park, Calif.
HALLAM NUCLEAR POWER FACILITY REACTOR OPERATIONS ANALYSIS PROGRAM.
Semiannual progress rept. no. 4, 29 Feb-30 Sep 64,
by W. S. Debear, S. Berger, D. K. Darley, D. N. Glass, and O. G. Jenkins, Jr. 15 May 65, 159p

Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Power reactors, Reactor operation), (*Reactor operation, Power reactors).

NAA-SR-10853 **Field 18F**
CFSTI Prices: HC$1.00 MF$0.50
Atomics International, Canoga Park, California.
ANALYSIS OF NEUTRON TRANSMISSION THROUGH SLABS OF LITHIUM HYDRIDE,
by R. S. Hubner. 25 Jul 65, 80p
Contract AT-11-1-GEN-8
Distribution: No limitation.

Descriptors: (*Neutron transport theory, Shielding), Lithium compounds, Hydrides.

NAA-SR-11123 **Field 18I**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga-Park, Calif.
HYDRAULIC STUDIES OF THE LSGR PROCESS CHANNEL,
by J. H. Brindley. 15 Jun 65, 47p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Sodium-graphite reactors, Reactor coolants), (*Reactor fuel elements, Cooling).

NAA-SR-11134 **Field 18J**
CFSTI Prices: HC$3.00 MF$0.50
Atomics International, Canoga Park, Calif.
THE HIGH-TEMPERATURE IRRADIATION BEHAVIOR OF HYPOSTOICHIOMETRIC URANIUM MONOCARBIDE,
by R. D. Hahn. 31 Aug 65, 54p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Uranium compounds, Radiation damage), (*Carbides, Radiation damage).

Identifiers: Uranium carbides.

NAA-SR-11142 **Field 18I, 18L**
CFSTI Prices: HC$4.00 MF$0.75
Atomics International, Canoga Park, Calif.
PIQUA NUCLEAR POWER FACILITY REACTOR OPERATIONS ANALYSIS PROGRAM.
Semi annual progress rept. no. 5 1 Jul-31 Dec 64.
15 Jun 65, 115p
Contract AT-11-1-GEN-8
Distribution: No limitation.

Descriptors: (*Power reactors, Reactor operation), (*Reactor operation, Power reactors), Reactor materials, Radioactive isotopes.

NAA-SR-11200 **Field 18I, 18L, 18M**
CFSTI Prices: HC$6.00 MF$1.50
Atomics International, Canoga Park, Calif.
AEC UNCLASSIFIED PROGRAMS.
Quarterly technical progress rept. for Jan-Mar 65.
15 Apr 65, 266p

Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Nuclear reactors, Scientific research), Reactor materials, Reactor fuels, Reactor system components.

NAA-SR-11309 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
THE EFFECT OF NEUTRON IRRADIATION ON THE LIQUID SODIUM DILATION OF GRAPHITE,
by D. L. Henry, K. T. Miller, and J. D. Stearns. 30 Jun 65, 27p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Graphite, Radiation damage), (*Reactor moderators, Graphite).

NAA-SR-11314 **Field 18I, 18L**
CFSTI Prices: HC$6.00 MF$1.50
Atomics International, Canoga Park, Calif.
200-Mwe PROTOTYPE LARGE SGR-REACTOR STRUCTURE DESIGN AND EVALUATION,
ed. by D. R. Anderson and K. W. Foster. 25 Jul 65, 296p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Sodium graphite reactors, Reactor operation), (*Reactor operation, Sodium graphite reactors).

NAA-SR-11327 **Field 18J, 18I, 18L**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
LARGE SGR CONTROL ROD DEVELOPMENT,
by M. D. Dermer. 25 Jul 65, 39p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Control rods, Sodium-graphite reactors), (*Sodium-graphite reactors, Control rods).

NAA-SR-11340 **Field 18J, 11B**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
PYROCHEMICAL REPROCESSING OF URANIUM CARBIDE.
Summary rept.,
by E. W. Murbach and G. E. Brand. 31 Aug 65, 38p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Reactor fuels, Decontamination), (*Uranium compounds, Carbides), Processing.

NAA-SR-11368 **Field 18I, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Atomics International, Canoga Park, Calif.
REACTIVITY WORTHS OF SEVERAL FAST REACTOR CONTROL MATERIALS.
by R. W. Campbell, and S. G. Carpenter. 25 Jul 65, 19p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Control rods, Fast reactors), (*Reactor materials, Effectiveness).

NAA-SR-11378 **Field 18I, 18K, 18L**
CFSTI Prices: HC$5.00 MF$1.00
Atomics International, Canoga Park, Calif.
FEASIBILITY STUDY OF A 1000-Mwe SODIUMCOOLED FAST REACTOR. VOLUME III. METHODS DEVELOPMENT.
25 Jul 65, 184p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Sodium, Fast reactors), (*Fast reactors, Feasibility studies).

NAA-SR-11396 **Field 18I**
CFSTI Prices: HC$3.00 MF$0.50
Atomics International, Canoga Park, Calif.
THE EFFECTS OF LONG-TERM OPERATION ON SRE SODIUM SYSTEM COMPONENTS,
by A. I. Hansen. 31 Aug 65, 50p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Reactor system components, Liquid metal cooled reactors), (*Sodium, Reactor system components), Corrosion.

NAA-SR-8884 **Field 18F, 6R**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
CURIE-DOSE-THUNDERHEAD. A DIGITAL COMPUTER PROGRAM FOR EXTERNAL AND INTERNAL RADIATION DOSE CALCULATIONS,
by G. P. Kenfield, W. R. Lahs, W. B. Sayer, R. M. MacAdams, and N. A. Harris. 15 Jun 65, 39p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Radiation measurement systems, Programming (Computers)), (*Radiological dosage, Determination), (*Fission products, Determination).

Identifiers: Curie.

NAA-SR-9821 **Field 18J, 13H**
CFSTI Prices: HC$1.25 MF$0.50
Atomics International, Canoga Park, Calif.
CALANDRIA CORE WELD JOINT DEVELOPMENT,
by J. G. Roberts. 30 Jun 65, 51p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Reactor cores, Welding), (*Welding, Reactor cores).

NLCO-955 **Field 18J, 7E**
CFSTI Prices: HC$3.00 MF$0.75
National Lead Co. of Ohio, Cincinnati.
SUMMARY TECHNICAL REPORT FOR THE PERIOD APRIL 1, 1965-JUNE 30, 1965,
ed. by R. Burgett and B. J. Thomas. 11 Aug 65, 71p
Contract AT (30-1)-1156
Distribution: No limitation.

Descriptors: (*Reactor fuel processing, Neutron activation), (*Radiochemistry, Reactor fuel elements).

NVO-162-12 **Field 18D**
CFSTI Prices: HC$2.00 MF$0.50
Reynolds Electrical and Engineering Co., Inc., Mercury, Nev. Radiological Sciences Dept.
KIWI B4A REACTOR OPERATION. ON-SITE RADIOLOGICAL SAFETY REPORT,
comp. and ed. by Bernard F. Eubank andC. R. Penwell. 30 Nov 62, 38p
Contract AT (29-2)-162
Distribution: No limitation.

Descriptors: (*Reactor safety systems, Health physics), (*Radiation monitors, Health physics).

NVO-162-13 **Field 18D, 6R**
CFSTI Prices: HC$2.00 MF$0.50
Reynolds Electrical and Engineering Co., Inc., Mercury, Nev. Radiological Sciences Dept.
KIWI BIB REACTOR OPERATION. ON-SITE RADIOLOGICAL SAFETY REPORT,
comp. and ed. by Bernard F. Eubank andC. R. Penwell. 1 Sep 62, 38p
Contract AT (29-2)-162
Distribution: No limitation.

Descriptors: (*Reactor safety systems, Reports), (*Health physics, Reactor safety systems).

NVO-162-15 **Field 18H, 6R**
CFSTI Prices: HC$1.00 MF$0.50
Reynolds Electrical and Engineering Co., Inc., Mercury, Nev. Radiological Sciences Dept.
THE NEVADA TEST SITE ENVIRONMENTAL-SURVEILLANCE PROGRAM,
by M. A. Glora and B. L. Brown. Jul 64, 7p
Contract AT (29-2)-162
Distribution: No limitation.

Descriptors: (*Nuclear explosions, Radiological contamination), Nevada.

NVO-162-17 **Field 18C, 6R**
CFSTI Prices: HC$1.00 MF$0.50
Reynolds Electrical and Engineering Co., Inc., Mercury, Nev. Radiological Sciences Dept.
PROJECT ROLLER COASTER QUARTERLY RESURVEY, JUNE 1964,
by M. A. Glora and B. L. Brown. Aug 64, 11p

Contract AT (29-2)-162
Distribution: No limitation.

Descriptors: (*Nuclear explosions, Test facilities), (*Test facilities, Nuclear explosions).

Identifiers: Roller coaster project.

NVO-162-5 **Field 18H, 06R, 18D**
CFSTI Prices: HC$1.00 MF$0.50
Reynolds Electrical and Engineering Co., Inc., Mercury, Nev. Radiological Sciences Dept.
REMOTE RADIATION MONITORING AT THE NEVADA TEST SITE,
by R. W. Hill, B. L. Brown, and V. M. Milligan. Apr 65, 10p CONF-279-3
Contract AT (29-1)-162
Presented at Annual Western Industrial Health Conference (7th), San Francisco, Calif. Sep 63.
Distribution: No limitation.

Descriptors: (*Nuclear explosions, Radiation monitors), (*Radiation monitors, Nuclear explosions), Nevada.

NYO-3008-1 **Field 18C, 8J**
CFSTI Prices: HC$2.00 MF$0.75
Woods Hole Oceanographic Institution, Mass.
OCEANOGRAPHIC OBSERVATIONS DURING OPERATION SWORDFISH.
Final rept.,
by Bostwick H. Ketchum, Nathaniel Corwin, and Paul B. Stimson. Oct 64, 60p Reference no. 64-45
Contract AT (30-1)-3008
Distribution: No limitation.

Descriptors: (*Oceanology, Nuclear explosions), (*Nuclear explosions, Oceanology).

Identifiers: Swordfish operation.

NYO-3304-3 **Field 18K**
CFSTI Prices: HC$4.00 MF$0.75
Dynatech Corp., Cambridge, Mass.
INVESTIGATION OF BOILING FLOW REGIMES AND CRITICAL HEAT FLUX.
Final rept.,
by M. Suo, A. E. Bergles, E. F. Doyle, L. Clawson, and P. Goldberg. 1 Mar 65, 110p Rept. no. Dynatech-517
Contract AT (30-1)-3304
Distribution: No limitation.

Descriptors: (*Critical assemblies, Heat transfer), (*Boiling water reactors, Fluid flow).

NYO-3304-4 **Field 18I, 20M**
CFSTI Prices: HC$1.00 MF$0.50
Dynatech Corp., Cambridge, Mass.
INVESTIGATION OF BOILING FLOW REGIMES AND CRITICAL HEAT FLUX.
Quarterly progress rept.for 15 Dec 64-15 Mar 65, by A. E. Bergles, E. G. Doyle, L. G. Clawson, M. Sou, and J. G. Bourne. 1 Apr 65, 24p Rept. no. 552
Contract AT (30-1)-3304
Distribution: No limitation.

Descriptors: (*Boiling water reactors, Phase studies), (*Feed water, Heat transfer), (*Gas flow, Phase studies).

NYO-3420-2 **Field 18L, 18I**
CFSTI Prices: HC$3.00 MF$0.75
Nuclear Utility Services, Inc., Washington, D. C.
HYDROGEN EVOLUTION WITHIN CONTAINMENT IN PM-TYPE PLANTS.
18 Jun 65, 58p
Contract AT (30-1)-3420
Distribution: No limitation.

Descriptors: (*Power reactors, Hydrogen), (*Hydrogen, Power reactors).

ORNL-P-1338 **Field 18A, 20I**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
ANOMALOUS PLASMA DIFFUSION IN MAGNETIC WELLS,
by T. K. Fowler and G. E. Guest. 1965, 23p CONF-650911-4
Contract W-7405-eng-26
Presented at the Conference on Plasma Physics and Controlled Nuclear Fusion Research (2nd) Abingdon, Berks, Eng. Distribution: No limitation.

Descriptors: (*Plasma physics, Magnetic pinch), (*Thermonuclear reactions, Control).

ORNL-P-140 **Field 18K**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
EFFECT OF FLOOR-REFLECTED NEUTRONS ON ROSSI-ALPHA MEASUREMENTS WITH THE HEALTH PHYSICS RESEARCH REACTOR,
by J. T. Mihalczo. 2 Jul 64, 9p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Neutron lifetime, Measurement), (*Research reactors, Neutron lifetime).

ORNL-P-1428 **Field 18J, 7B**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
THE CHEMISTRY AND THERMODYNAMICS OF MOLTEN SALT REACTOR FLUORIDE SOLUTIONS,
by C. F. Baes, Jr. 1965, 34p CONF-650704-6
Contract W-7405-eng-26
Presented at the IAEA Symposium on Thermodynamics, Vienna. Distribution: No limitation.

Descriptors: (*Fused salts cooled reactors, Fluorides), Reactor fuels, Salts.

ORNL-P-1438 **Field 18A**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
OPERATING AND REPAIR EXPERIENCES ON DCX-2 COILS,
by S. M. Decamp. 1965, 10p CONF-650512-4
Contract W-7405-eng-26
Presented at the Symposium on Engineering Problems of Controlled Thermonuclear research, Livermore, Calif. Distribution: No limitation.

Descriptors: (*Thermonuclear reactions, Coils), (*Coils, Thermonuclear reactions).

ORNL-TM-1081 **Field 18G**
CFSTI Prices: HC$5.00 MF$1.25
Oak Ridge National Lab., Tenn.
WASTE TREATMENT AND DISPOSAL.
Semiannual progress rept. for Jul-Dec 64, by F. L. Parker and R. E. Blanco. May 65, 168p

Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Radioactive waste, Disposal).

ORNL-TM-1103 **Field 18J, 7A**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
CHEMICAL TECHNOLOGY DIVISION, UNIT OPERATIONS SECTION.
Monthly progress rept. for Mar 65, by M. E. Whatley, P. A. Haas, R. W. Horton, A. D.Ryon and C. D. Watson. Jun 65, 15p
Contract W-7405-eng-26
See also ORNL-TM-1094. Distribution: No limitation.

Descriptors: (*Fused salts cooled reactors, Materials), (*Reactor fuel processing, Power reactors).

ORNL-TM-1191 **Field 18C, 7A**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
CHEMICAL APPLICATIONS OF NUCLEAR EXPLOSIONS (CANE).
Progress rept for 1 Jan-30 Jun 65, comp. by K. B. Brown and C. A. Blake, Jr. 20 Jul 65, 17p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Nuclear explosions, Nuclear industrial applications), (*Chemical engineering, Nuclear explosions).

ORNL-TM-973 **Field 18F, 11B**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
A CALCULATION OF THE NEUTRON DOSE IN ORDINARY CONCRETE DUE TO AIR-SCATTERED NEUTRONS FROM A POINT FISSION SOURCE,
by D. K. Trubey. 15 Mar 65, 12p
Contract W-7405-eng-26
Distribution: no limitation.

Descriptors: (*Concrete, Neutron scattering), (*Neutrons, Concrete).

ORNL-3611 **Field 18J**
CFSTI Prices: HC$5.00 MF$1.25
Oak Ridge National Lab., Tenn.
STATUS AND PROGRESS REPORT FOR THORIUM FUEL CYCLE DEVELOPMENT FOR PERIOD ENDING DECEMBER 31, 1963,
comp by R. G. Wymer and D. A. Douglas, Jr. Jul 65, 169p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Reactor fuel processing, Thorium), (*Thorium, Fuel burn up).

ORNL-3721, Suppl. 1 **Field 18G, 18H**
CFSTI Prices: HC$3.00 MF$0.75
Oak Ridge National Lab., Tenn.
CONCENTRATIONS, TOTAL STREAM LOADS, AND MASS TRANSPORT OF RADIONUCLIDES IN THE CLINCH AND TENNESSEE RIVERS. SUPPLEMENT NO. 1 TO STATUS REPORT NO. 5 ON CLINCH RIVER STUDY,
by M. A. Churchill, J. S. Cragwall, Jr., R. W. Andrew and S. Leary Jones. Aug 65, 76p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Rivers, Radioactive waste), (*Radioactive waste, Rivers).

ORNL-3807 **Field 18I, 18J**
CFSTI Prices: HC$7.00 MF$1.75
Oak Ridge National Lab., Tenn.
GAS-COOLED REACTOR PROGRAM.
Semiannual progress rept. for period ending 31 Mar 65,
Jun 65, 316p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Gas-cooled reactors, Scientific research).

Patent 3,205,357 **Field 18D, 9C**
SOLID STATE RADIATION DETECTOR.
Patent assigned to AEC,
by William F. Lindsay. 7 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Semiconductors, Radiation measurement systems), (*Radiation measurement systems, Semiconductors), Diodes (Semiconductor), Nuclear particles, Electromagnetic waves, Monitors, Patents.

The solid state detector is capable of measuring fast transient, high intensity radiation flux, including that of small particle and electromagnetic radiation. The detector comprises a high resistivity, step junction semiconductor diode having a thin, heavily doped surface or 'base' region, in combination with elements for applying a reverse bias to the diode sufficient to minimize or entirely remove the neutral region of the diode. A luminescent material, e.g., a scintillating fluor, may be used for increased sensitivity.

Patent 3,208,818 **Field 18J**
METHOD FOR STABILIZING URANIUM MONOCARBIDE.
Patent assigned to AEC,
by Robert F. Stoops and John V. Hamme. 28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Reactor fuel processing, Stabilization), (*Uranium compounds, Carbides), Oxygen compounds, Synthesis (Chemistry), Crystal lattices, Phase studies, Oxidation, Hydrolysis, Inhibition, Power reactors, Reactor fuels, Patents.

Identifiers: Uranium carbides.

Uranium monocarbide is used as a nuclear fuel in power-producing nuclear reactors operating at high power levels to high fuel burnups. An oxygen-saturated uranium carbide composition is disclosed which is relatively resistant to oxidation and hydrolysis.

Patent 3,208,819 **Field 18J, 18G**
METHOD FOR DECONTAMINATING NUCLEAR FUELS CONTAINING RUTHENIUM COMPLEXES.
Patent assigned to AEC,
by Richard M. Wallace. 28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Reactor fuels, Decontamination), (*Fission products, Ruthenium com-

pounds), (*Complex compounds, Ruthenium compounds), Reactor fuel processing, barbituates, Uranium, Plutonium, Solvent extraction, Nitric acid, Phosphates, Ion exchange resins, Patents.

Identifiers: Barbituric acids.

The process is for the decontamination of neutronirradiated nuclear fuels from each other and their fission products including ruthenium complexes in aqueous solutions. Barbituric acid is added to the aqueous solution in sufficient quantity to maintain the ruthenium complexes at an elevated temperature.

Patent 3,208,912 **Field 18I, 18J**
NUCLEAR REACTOR FUEL MANAGEMENT METHOD.
Patent assigned to AEC
byBY Seymour Jaye, Solana Beach and Dana H. Lee, Jr. 28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Reactor fuel processing, Power reactors), (*Breeder reactors, Reactor fuel processing), Reactor operation, Uranium, Thorium, Fuel burn up, Reactor fuels, Patents.

The method relates to the operation of a nuclear reactor utilizing a thorium-uranium 233 breeding cycle. The reactor is for producing useful power such as steam for the generation of electricity. The method involves, after a period of use, the removal of a selected portion of the fuel units, reprocessing them to recover fissile nuclides and returning these nuclides, recovered thorium and make-up enriched uranium to the reactor for another cycle.

Patent 3,208,916 **Field 18J**
FUEL ELEMENT FOR A NUCLEAR REACTOR.
Patent assigned to AEC,
by Robert J. Hennig and Duane T. Aase. 28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Reactor fuel elements, Fast reactors), (*Fast reactors, Reactor fuel elements), Patents.

The fuel element is for a fast nuclear reactor. It is made up of a prism containing a fissionable material and a plurality of parallel closely spaced tubes extending lengthwise of the prism through the fissionable material. The outermost tubes form part of a wall surrounding the prism.

Patent 3,211,094 **Field 18A**
EXPLOSIVE WAVE SHAPER.
Patent assigned to Navy,
by Thomas P. Liddiard, Jr. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Detonation waves, Configuration), Explosive materials, Patents.

Identifiers: Wave shaper.

An explosive wave shaping system or wave shaper is disclosed. A 'flying' plate or disk of uniform thickness between the donor explosive and the acceptor explosive. The plate is driven against the acceptor explosive with sufficient force to detonate it. The invention utilizes the fact that the free flight time of the inert solid is an inverse function of its thickness; the thicker the solid the greater is its free flight time. In effect, the variable thickness of the inert solid acts in a manner analogous to a variable index of refraction optical lens.

Patent 3,211,664 **Field 18J**
URANIUM MONONITRIDE FUEL AND METHOD OF MAKING.
Patent assigned to AEC,
by Roy W. Endebrock. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Reactor fuels, Preparation), (*Uranium compounds, Nitrides), Uranium alloys, Titanium alloys, Nitration, Titanium compounds, Electric arcs, Patents.

Identifiers: Uranium mononitride.

Uranium mononitride is used as a fuel or fertile material in nuclear reactors. An improvement is disclosed in the reaction of uranium metal and elemental nitrogen under pressure within an electric arc to produce uranium mononitride. The improvement consists in prealloying the uranium metal with from 5 to 20 weight percent of titanium metal.

Patent 3,211,812 **Field 18J**
METHOD OF MAKING NUCLEAR FUEL COMPACT.
Patent assigned to AEC,
by Dale E. Johnson and Fred H. Lofftus. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Reactor fuels, Preparation), (*Refractory coatings, Reactor fuels), Aluminum compounds, Beryllium compounds, Oxides, Particles, Uranium compounds, Particle size, Binders, Polyvinyl alcohol, Solvents, Patents.

Identifiers: Aluminum oxides, Beryllium oxides, Polyvinyl acetate, Uranous oxide.

Ceramic reactor fuel bodies with uniform heat production and heat transfer characteristics are prepared by coating mechanically densified particulate nuclear fuels with a protective, finely-divided refractory material admixed with a binder. The binder is subsequently sintered to produce a coated body in which the fuel is retained in particulate form. Prefered materials are: uranium oxide fuel; alumina, beryllia, and mixtures thereof, as the refractory coating; and polyvinyl acetate or polyvinyl alcohol binder.

Patent 3,212,940 **Field 18D, 9A**
METHOD FOR PRODUCING P-I-N SEMICONDUCTORS.
Patent assigned to AEC,
by James L. Blankenship. 19 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Semiconductors, Doping), (*Doping, Semiconductors), (*Crystal detectors, Semiconductor devices), Vapor ploting, Diffusion, Diodes (Semiconductors), Silicon, Impurities, Phosphorous, Lithium, Metal coatings, Aluminum coatings, Corrosion inhibition, Coatings, Vacuum apparatus.

The semiconductor is for the detection of nuclear particles. The P-I-N detector is made by diffusing an impurity into the bulk semiconductor material through a layer of a second impurity having like impurity conductive characteristics, to produce a diode that can be drifted and has a thin dead layer.

Patent 3,212,975 **Field 18I**
METHOD OF CONTROLLING A NUCLEAR REACTOR.
Patent assigned to AEC,
by John F. Fletcher and Kadzuhisa G. Toyoda. 19 Oct 65
Available from ommissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Reactor control, Power reactors), Reactor coolants, Nuclear power plants, Pressurized water reactors, Thermal utilization, Patents.

The nuclear reactor is of the type in which coolant traverses the reactor core in a plurality of passes. The outlet temperature of the coolant from each pass is monitored. A portion of the coolant flow from the reactor inlet line to the inlet of each coolant pass is bypassed and the flow through the bypass lines is adjusted inversely with respect to variations in the outlet temperature of the last pass bypassed while maintaining total flow of the coolant through the reactor constant.

Patent 3,212,982 **Field 18J, 18L**
FAST FUEL TEST REACTOR.
Patent assigned to AEC,
by Eugene R. Astley, Lester M. Finch and Robert J.Hennig. 19 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Test reactors, Fast reactors), (*Fast reactors, Breeder reactors), Power reactors, Reactor fuel elements, Reactor cores, Reactor fuel processing, Patents.

The fast fuel test reactor is used in the production of power. It includes a central vertical process tube and a plurality of process tubes arranged in concentric hexagons around the central tubes in a skewed-conical relationship. The process tubes include a twisted hexagonal tapered portion containing a fuel assembly. These portions geometrically mate one with another to define a core of minimum voids.

Patent 3,212,986 **Field 18L, 18I**
THREE TANK SEPARATE SUPERHEAT REACTOR.
Patent assigned to AEC,
by Robert T. Pennington. 19 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Power reactors, Steam power plants), Containment, Reactor control, Reactor operation, Reactor reactivity, Control rods, Reactor safety systems, Patents.

The nuclear reactor is used for superheating steam. A liquid moderating material flows through moderator containment tubes so that the liquid does not come in contact with the fuel elements. Any liquid entering the fuel region through flooding or leakage is arranged to be immediately drained out of the reactor. The arrangement eliminates the requirement for disconnecting any piping and use of heavy duty hoists. Access to the core for refueling the reactor is achieved merely by first pumping or otherwise removing the liquid biological shield material from the tank shaped cover and then, using relatively light duty hoists, or other means, lifting the cover from the reactor vesse.

Patent 3,212,987 **Field 18L, 18I**
NEUTRONIC REACTOR WITH INTERLOCKING DIF- FUSER END GRID.
Patent assigned to AEC,
by Avrel Mason. 19 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Power reactors, Mobile), Nuclear propulsion, Nuclear powered vessels, Aircraft nuclear propulsion, Thermal stresses, Acceleration, Stability, Reactor cores, Honeycomb cores, Patents.

The nuclear reactor may be used in the power plant of an airplane, ship, or other moving vehicle. An interlocking arrangement is provided whereby the core bricks are maintained rigidly in position even during violent accelerations.

Patent 3,212,991 **Field 18J**
CONTINUOUS SUPPORT FUEL ROD SPACER SYSTEM.
Patent assigned to AEC,
by Glen V. Brynsvold and William A. Sangster. 19 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Reactor fuel rods, Supports), Thermal stresses, Fast reactors, Reactor fuel elements, Patents.

The fuel rod spacers are used in combination with a nuclear reactor core having an ordered array of

cylindrical fuel elements. The spaced device is in the form of a tube having one continuous slot or a plurality of slots cut in the sides in a particular novel manner and adapted for disposition in the interstitial spaces between fuel elements to provide an elastic supporting action continuous along the length of the supported fuel element, and, at the same time, permit the fuel elements to expand and contract without losing support.

Patent 3,213,162 **Field 18J, 13H**
METHOD OF MAKING NUCLEAR FUEL COMPACT.
Patent assigned to AEC,
by Dale E. Johnson and Fred H. Lofftus. 19 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Reactor fuel processing, Ceramic materials), Compacting, Refractory materials, Uranium compounds, Powders, Oxides, Carbides, Silicides, Slurry coating, Reactor materials, Patents.

The fuel bodies, for use in nuclear reactors, are ceramic in form, combining ceramic nuclear fuel with a protective refractory material. The ceramic nuclear fuel particles are selected from the oxides, carbides and silicides of nuclear fuel metals. Alumina may be used as the protective refractory material.

Patent 3,214,974 **Field 18D**
REMOTE ACOUSTICAL SENSOR.
Patent assigned to AEC,
by Lawrence Altman and Donald Gertz. 2 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Liquid level gages, Pressurized water reactors), (*Acoustic detectors, Liquid level gages), Patents, Transducers.

The apparatus is used in a pressurized water reactor of a nuclear reactor to measure water level. The apparatus includes a stepshaft reflector attached to the top of a closed container and suspended in the water and a transducer attached to the underside of the container. The transducer is connected to driving and receiving circuits. The stepshaft is machined from a cylindrical member from which a plurality of spirally-arranged wedged steps are cut. The flat surfaces of the steps reflect sound pulses from the transducer to indicate level.

PB-168 560 **Field 18F**
CFSTI Prices: HC$1.00 MF$0.50
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
A STUDY OF SOME RADIOPROTECTION APPARATUSES USED IN THE CASE OF REACTORS (Etude de Quelques Dispositifs de Radioprotection en Service Aupres des Piles Piscines),
by Emmanuel de Robien, Henri de Choudens, andJacques Delpuech. Oct 65, 19p Rept. no. CEA-R-2864
Text in French, Attached summary in English. Distribution: No limitation.

Descriptors: (*Nuclear reactors, Dosimeters), Health physics instrumentation, Radioactive isotopes, Iodine, Scintillation counters, Charcoal, Gamma rays, Beta particles, France.

Problems of radioprotection concerning swimming-pool reactors have led to solutions. The automatic verification of the staff-radioactivity has been realized thanks to a 'portique beta gamma' which is insensitive to the ambient background in the reactor-hall. The automatic verification of the contamination of the shoes belonging to the agents that work in these reactors has been realized. The necessity to measure precisely gamma doses with the help of an autonomous apparatus has led to the making of a plasticscintillator gamma dosimeter. The obligation to forbid the opening of doors in some places where there might be a great intensity of radiation has led to have doors open according to the intensity of radiation inside the rooms. Liberation of radioactive iodine has been measured with activated charcoal cartridges that surround a scintillator connected with a monocanal selector. The control of reactor safety rod fall in case of a radioactive accident has been secured by a chain whose detector is a chamber immersed in the swimming pool. (Author)

PB-168 562 **Field 18F, 18G**
CFSTI Prices: HC$3.00 MF$0.75
Commissariat a l'Energie Atomique, Fontenay-AuxRoses (France). Centre d'Etudes Nucleaires.
ON SOME USES OF THE RECORDING OF FISSION FRAGMENTS OCCURRING IN INSULATORS (Sur Quelques Utilisations de l'Enregistrement des Fragments de Fission dans les Isolants),
by Jean Mory. Sep 65, 63p CEA-R-2846
Text in French, Attached summary in English. Distribution: No limitation.

Descriptors: (*Fission products, Recording systems), (*Thermal insulation, Fission products), Dosimeters, Thermal neutrons, Fast neutrons, Dosimeters, France, Electric insulation.

The passage of fission fragments is manifested in insulators by the formation of damage lines which can easily be observed by transparence using the electron microscope after a suitable chemical attack. Since the recording efficiency is 100 per cent for mica and plastics this phenomenon has a certain number of applications. After briefly recalling the interaction processes between charged particles and matter, and giving a quantitative study of the relationships connecting the various parameters, the author considers here some of these applications: (1) thermal neutron dosimetry : it is possible to measure integrated fluxes of between 1000 and 10 to the 21st power n/sq cm, according to the method used; (2) fast neutron dosimetry : by using fission fragment threshold sources it is easy to measure biological type doses of about 1 rem : (3) dosage of very low fissile impurity concentrations : atomic concentrations of about 10 to the -9th power can be measured; this limit has never been attained by conventional methods; (4) study of fissile elements occurring in atmospheric dusts. Results are given of an automated counting test for traces effected by measuring the electrical resistivity of the irradiated membrane. The advantages and disadvantages of these solid detectors are given, especially with respect to nuclear emulsions whose uses are approximately identical.

PB-168 565 **Field 18K, 12A**
CFSTI Prices: HC$3.00 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
MONTE-CARLO METHOD - CODES FOR THE STUDY OF CRITICALITY PROBLEMS (ON IBM 7094) (Methode de Monte-Carlo - Codes pour l'Etude des Problemes de Criticite (IBM 7094),
by Jean Moreau, Hubert Rabot, and Claude Robin. Oct 65, 79p Rept. no. CEA-R-2872
Text in French attached summary in English. Distribution: No limitation.

Descriptors: (*Monte Carlo method, Multiplication factor), (*Multiplication factor, Monte Carlo method), (*Critical assemblies, Multiplication factor), France.

Identifiers: IBM 7094.

The two codes presented allow to determine the multiplication constant of media containing fissionable materials under numerous and divided forms; they are based on the Monte-Carlo method. The first code apply to x, y, z, geometries. The volume to be studied ought to be divisible in parallelepipeds, the media within each parallelepiped being limited by non-secant surfaces. The second code is intended for r, t, z, geometries. The results include an analysis of collisions in each medium. Applications and examples with informations on time and accuracy are given. (Author)

PB-168 566 **Field 18J, 18K**
CFSTI Prices: HC$3.00 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
THEORETICAL ASPECTS AND EXPERIMENTAL OF NEUTRONIC INTERACTION OF MULTIPLYING MEDIA (Aspects Theoriques et Experimentaux de l'Interaction Neutronique entre Milieux Multiplicateurs de Neutrons),
by Jean-Claude Mougniot. Oct 65, 92p Rept. no. CEA-R-2849
Text in French, attached summary in English. Distribution: No limitation.

Descriptors: (*Neutron reactions, Reactor materials), Neutron transport theory, Multiplication factor, Albedo, Reactor safety systems, Matrix algebra, France.

A theoretical study of neutronic interaction of multiplying media is presented. The use of the surface multiplication constant and of the effective multiplication constant is considered. Three classical methods of interaction calculations are studied in parallel and the application of the Keff method to problems of nuclear safety is discussed. (Author)

PNE-102F **Field 18G, 8B, 18C**
CFSTI Prices: HC$4.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Livermore.
ISOTOPE PROGRAM.
Final rept.,
by Marcel W. Nathans. Jan 65, 120p
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Fission products, Nuclear explosions), (*Isotope availability, Underground explosions).

Identifiers: Gnome shot.

PNE-503F **Field 18C**
CFSTI Prices: HC$0.45 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
BASE SURGE AND CLOUD FORMATION.
Final rept.,
by Robert Rohrer. April 65, 10p
Contract W-7405-eng-48
Rept. on Proj. Pre-SCHOONER, Nevada test site, Feb 64. Distribution: No limitation.

Descriptors: (*Cratering, Nuclear explosions), (*Clouds, Explosion effects).

Identifiers: Pre-Schooner project.

PNE-608F **Field 18C, 19D**
CFSTI Prices: HC$3.00 MF$0.75
Sandia Corp., Albuquerque, N. Mex.
CLOSE-IN AIR BLAST FROM A ROW CHARGE IN BASALT,
by L. J. Vortman. May 65, 72p
Contract AT (29-1)-789
Rept. on Proj. DUGOUT, Nevada test site, 24 Jun 64. Distribution: No limitation.

Descriptors: (*Airburst, Charges (Explosive)), (*Cratering, Airburst).

Identifiers: Dugout project.

PNE-609F **Field 18C, 19D**
CFSTI Prices: HC$3.00 MF$0.75
Army Engineer Waterways Experiment Station, Vicksburg, Miss. Nuclear Weapons Effects Div.
DEEP UNDERGROUND SHOCK MEASUREMENTS,
by J. D. Day. Dec 64, 54p
Rept. on project DUGOUT, Nevada Test Site, 24 Jun 1964. Distribution: No limitation.

Descriptors: (*Cratering, Shock waves), (*Shock waves, Detonations).
Identifiers: Dugout project.

PWAC-453 **Field 18K**
CFSTI Prices: HC$3.00 MF$0.50
Pratt and Whitney Aircraft, Middleton, Conn. Aircraft Nuclear Engine Lab.
DETERMINATION OF RELATIVE POWER DISTRIBUTIONS IN CANEL CRITICAL ASSEMBLIES USING CATCHER FOIL TECHNIQUES,
by W. F. Welsh. 24 Feb 65, 45p
Contract AT (30-1)-2789
Distribution: No limitation.

Descriptors: (*Critical assemblies, Reactor power density), (*Reactor power density, Critical assemblies).

RAI-350 **Field 18G, 7E**
CFSTI Prices: HC$2.00 MF$0.50
Radiation Applications, Inc., Long Island City, N. Y.
THE REMOVAL OF METALLIC IONS BY FOAMING AGENTS AND SUSPENSIONS: LABORATORY AND ENGINEERING STUDIES.
Annual rept. for 1 Jul 63-30 Jun 64,
by Jacques J. Weinstock. 23 Mar 65, 41p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Radioactive waste, Ions), (*Ions, Radioactive waste), (*Metals, Ions).

RFP-500 **Field 18D**
CFSTI Prices: HC$1.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
AN ANALYZER FOR RADIOACTIVE GAS,
by R. T. Merrill. 11 May 65, 14p
Contract AT (29-1)-1106
Distribution: No limitation.

Descriptors: (*Gas analysis, Radiation monitors), (*Tritium, Gas analysis).

RFP-501 **Field 18B, 13D, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
PLUTONIUM OXIDE SHIPPING PACKAGES,
by F. E. Adcock, J. T. Byrne, and R. L. Delnay. 28 Apr 65, 87p
Contract AT (29-1)-1106
Distribution: No limitation.

Descriptors: (*Pultonium compounds, Oxides), (*Packaging, Plutonium compounds), Containers, Transportation.

RL-NRD-81 **Field 18E, 18I, 18L**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
OPERATIONAL MODES ANTICIPATED FOR THE CONVERTED N-REACTOR PLANT,
by R. E. Hall and E. W. Wilson. 20 Jan 65, 20p

Contract AT (45-1)-1350
Distribution: No limitation.

Descriptors: (*Power reactors, Reactor operation), (*Reactor operation, Power reactors).

RL-REA-183 **Field 18F, 18K**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
UNIVERSAL VERTICAL SAFETY ROD REACTIVITY EVALUATION,
by W. A. Blyckert. 18 Nov 64, 16p
Contract AT (45-1)-1350
Distribution: No limitation.

Descriptors: (*Reactor safety systems, Control rods), (*Reactor reactivity, Reactor safety systems).

RL-SA-16 **Field 18B**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
CLEAN URANIUM-233,
by W. K. Woods. 1 Feb 65, 9p CONF-650402-1
Contract AT (45-1)-1350
Prepared for presentation at American Society of Certified Engineering Technology, Richland, Wash. Distribution: No limitation.

Descriptors: (*Isotope impurities, Uranium), (*Uranium, Isotope separation).

RL-SEP-496 **Field 18G**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
WASTE MANAGEMENT PROGRAM. CHEMICAL PROCESSING DEPARTMENT. REVIEW OF COST AND INCENTIVES,
by S. J. Beard and P. W. Smith. 25 May 65, 12p

Contract AT (45-1)-1350
Distribution: No limitation.

Descriptors: (*Radioactive waste, Disposal), (*Costs, Radioactive waste).

RPI-328-19 **Field 18K, 18I, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Nuclear Engineering and Science.
MONOP3, A FORTRAN II PROGRAM FOR THE PHILCO-2000 COMPUTER TO SOLVE THE TWO DIMENSIONAL EQUIVALENT CELL PROBLEM IN THE P3 APPROXIMATION,
by Thomas E. Dudley. 1965, 9p
Contract AT (30-3)-328
Distribution: No limitation.

Descriptors: (*Reactor lattice parameters, Programming (Computers)).

Identifiers: Philco 2000 computer, Fortran II.

RPI-328-33 **Field 18K, 20H**
CFSTI Prices: HC$2.00 MF$0.50
Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Nuclear Engineering and Science.
THE EFFECTS OF COHERENT SCATTERING ON THE THERMALIZATION OF NEUTRONS IN BERYLLIUM,
by E. R. Gaerttner, P. B. Daitch, R. R. Fullwood, R. R. Lee, and R. E. Slovacek. 1964, 26p CONF-650504-6
Contract AT (30-3)-328
Presented at IAEA Symposium on Pulsed Neutron Methods, Karlsruhe, Germany. Distribution: No limitation.

Descriptors: (*Coherent scattering, Thermal neutrons), (*Buckling (Neutron density), Beryllium).

SC-R-64-1373 **Field 18H, 9A**
CFSTI Prices: HC$3.00 MF$10.75
Sandia Corp., Albuquerque, N. Mex.
NEUTRON BOMBARDMENT REDUCTION OF TRANSISTOR CURRENT GAIN,
by C. A. Goben. Dec 64, 96p
Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Radiation damage, Transistors), (*Nautron reactions, Radiation damage).

SC-RR-64-1793 **Field 18H, 6R**
CFSTI Prices: HC$3.00 MF$0.75
Sandia Corp., Albuquerque, N. Mex.
PROJECT SAND FINAL PROGRAM REPORT. VOLUME I,
by D. Q. Matejka and W. L. Wood. Apr 65, 57p

Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Radioactive fallout, Samplers).

Identifiers: SAND project.

SC-RR-65-184 **Field 18H**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
FALLOUT REPORT: BETA-GAMMA RADIOACTIVITY IN AIR AT SANDIA LABORATORY, JULY THRU DECEMBER 1964,
by R. E. Womelsduff. Apr 65, 11p
Contract AT (29-1)-789
Distribution: No limitations.

Descriptors: (*Radioactive fallout, New Mexico), Beta particles, Gamma rays.

SC-RR-65-220 **Field 18C, 19D**
CFSTI Prices: HC$5.00 MF$1.00
Sandia Corp., Alburquerque, N. Mex.
COMPILATION OF CRATER DATA,
by John P. Dietz and Dennis B. Hayes. Jul 65, 160p
Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Cratering, Underground explosions), (*Underground explosions, Cratering).

SC-RR-65-41 **Field 18C, 13B**
CFSTI Prices: HC$2.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
A SMALL-SCALE INVESTIGATION OF THE POSSIBILITY OF CONSTRUCTING LOW-RELIEF EARTH-FILL DAMS USING NUCLEAR EXPLOSIVES,
by L. J. Vortman. Feb 65, 35p
Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Nuclear explosions, Nuclear industrial applications), (*Dams, Nuclear explosions).

SC-RR-65-43 **Field 18N, 21F**
CFSTI Prices: HC$7.70 MF$1.50
Sandia Corp., Albuquerque, N. Mex.
RE-ENTRY FLIGHT DEMONSTRATION NUMBER TWO.
Final rept.
8 Apr 65, 264p
Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Auxiliary power plants, Flight testing), (*Reentry vehicles, Auxiliary power plants).

Identifiers: RFD-2 reentry vehicle.

SC-RR-65-98 **Field 18B, 18G, 18J, 6B,2**
CFSTI Prices: HC$10.58 MF$3.00
Sandia Corp., Albuquerque, N. Mex.
PROCEEDINGS OF THE INTERNATIONAL SYMPOSIUM FOR PACKAGING AND TRANSPORTATION OF RADIOACTIVE MATERIALS, HELD AT ALBUQUERQUE, NEW MEXICO, JANUARY 12-15, 1965.
Jun 65, 743p CONF-650103
Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Transportation, Radioactive isotopes), (*Radioactive isotopes, Containers), (*Symposia, Radioactive isotopes), Radioactive waste, Reactor materials, Reactor fuels.

SROO-207-30 **Field 18I**
CFSTI Prices: HC$4.00 MF$1.75
General Nuclear Engineering Corp., Dunedin, Fla.
HYDRAULIC BALL (HY-BALL) CONTROL SYSTEM DEVELOPMENT PROGRAM.
Final rept.,
by S. J. Weems, S. E. Turner, R. L. Lyerly, D. J. Blair, and W. S. O'Brien. 5 Jun 64, 340p
Contract AT (38-1)-207
Distribution: No limitation.

Descriptors: (*Reactor control, Hydraulic systems).

STL-372-13 **Field 18K, 18D**
CFSTI Prices: HC$4.00 MF$1.00
TRW Space Technology Labs., Redondo Beach, Calif. Physical Electronics Lab.
KINETIC STUDIES OF HETEROGENEOUS WATER REACTORS.
Annual summary rept. for 1964,
by C. T. Molloy, L. G. Neal, N. C. Pate, L. B. Wentz and R. W. Wright. 30 Dec 64, 142p
Contract AT (04-3)-372
Distribution: No limitation.

Descriptors: (*Reactor kinetics, Heterogeneous reactors), (*Heterogeneous reactors, Reactor safety systems).

TID-20471 **Field 18G, 7C**
CFSTI Prices: HC$2.00 MF$0.50
California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
EFFECT OF CHELATES ON THE MOVEMENT OF FISSION PRODUCTS THROUGH SOIL COLUMNS,
by E. H. Essington and H. Nishita. 20 Feb 64, 39p
Contract AT (04-1)-GEN-12
Distribution: No limitation.

Descriptors: (*Fission products, Chelate compounds), (*Chelate compounds, Fission products), (*Soils, Fission products).

TID-21757 **Field 18E**
CFSTI Prices: HC$2.00 MF$0.50
Societe d'Energie Nucleaire Franco-Belge des Ardennes, Chooz-lez-Givet (France).
ARDENNES NUCLEAR POWER PLANT.
Quarterly rept. no. 10, 1 Oct - 30 Dec 64,
27 Jan 65, 39p
Distribution: No limitation.

Descriptors: (*Nuclear power plants, Design).

TID-21855 **Field 18H**
CFSTI Prices: HC$2.00 MF$0.50
Aerojet-General Corp., Downey, Calif. Research and Engineering Div.
INVESTIGATION OF COALESCENCE OF SOLIDLIQUID SYSTEMS.
Rept. for 1 May 64-30 Apr 65,
by R. L. MacLean and T. A. Gaukler. 28 Apr 65, 49p Rept. no. 0780-01-02-FP
Contract AT (04-3)-474
Distribution: No limitation.

Descriptors: (*Radioactive fallout, Atmospheric precipitation).

Identifiers: Coalescence.

TID-21861 **Field 18I, 18L**
CFSTI Prices: HC$3.00 MF$0.75
Consumers Public Power District, Hallam, Nebr.
HALLAM NUCLEAR POWER FACILITY.
Monthly operating rept. no. 32,
Mar 65, 77p
Contract AT (11-1)-513
Distribution: No limitation.

Descriptors: (*Power reactors, Reactor operation), (*Reactor operation, Power reactors).

TID-21926 **Field 18D, 6R**
CFSTI Prices: HC$2.00 MF$0.50
Tennessee Univ., Knoxville. Dept. of Electrical Engineering.
STABILIZED LOW-POWER OPERATION OF THE PERSONNEL RADIATION MONITOR.
Scientific rept. no. 7,
by F. J. Kennedy and J. F. Pierce. 22 Mar 63, 36p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Radiation monitors, Operation).

TID-3315 **Field 18J, 11F, 18I, 18B**
CFSTI Prices: HC$5.00 MF$1.00
Division of Technical Information Extension (AEC), Oak Ridge, Tenn.
NUCLEAR MATERIALS MANAGEMENT. AN ANNOTATED BIBLIOGRAPHY OF SELECTED LITERATURE,
comp. by Theodore F. Davis and James E. Lovett. Aug 65, 156p
Prepared in cooperation with Division of Nuclear Materials Management (AEC), Washington, D. C. Distribution: No limitation.

Descriptors: (*Nuclear engineering, Bibliographies), (*Bibliographies, Nuclear engineering), Reactor materials.

TID-6506 (Pt. I) (3rd ed.) **Field 18J**
CFSTI Prices: HC$6.00 MF$1.25
Division of Reactor Development and Technology (AEC), Washington, D. C.
SUMMARIES OF FUELS AND MATERIALS DEVELOPMENT PROGRAMS,
by William L. R. Rice. Oct 64, 264p
Distribution: No limitation.

Descriptors: (*Reactor materials, Scientific research), (*Reactor fuels, Scientific research).

TID-7697 **Field 18D, 18J, 18H**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, ichland, Wash.
HANFORD IRRADIATION CAPSULES FOR IN-REACTOR CREEP MEASUREMENTS AND URANIUM SWELLING STUDIED,
by J. A. Williams and R. D. Leggett. Mar 64, 20p

Contract AT (45-1)-1350
Presented at Symposium on Problems in Irradiation Capsule Experiments, Germantown, Md. 8-10 Oct 1963. Distribution: No limitation.

Descriptors: (*Reactor materials, Creep), (*Uranium, Deformation), (*Radiation damage, Instrumentation).

TID-8200 **Field 18L, 18M**
CFSTI Prices: HC$1.00 MF$0.50
Office of the Assistant General Manager for Reactors (AEC), Washington, D. C.
NUCLEAR REACTORS BUILT, BEING BUILT, OR PLANNED IN THE UNITED STATES AS OF JUNE 30, 1965.
30 Jun 65, 28p
Distribution: No limitation.

Descriptors: (*Nuclear reactors, United States).

UCRL-11623 **Field 18D, 14B**
CFSTI Prices: HC$4.00 MF$1.00
Lawrence Radiation Lab., Univ. of California, Berkeley.
ULTRACENTRIFUGE PHOTOELECTRIC SCANNER, MULTIPLE CELL,
by Kenneth W. Lamers. 1 Apr 65, 130p
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Ultracentrifuges, Phototubes), (*Phototubes, Scanning).

UCRL-12180 rev. 2 **Field 18C, 8I**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
AGGREGATE PRODUCTION WITH NUCLEAR EXPLOSIVES,
by Spenst M. Hansen and John Toman. 12 May 65, 36p
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Nuclear explosions, Mining engineering), (*Mining engineering, Nuclear explosions).

UCRL-12476 **Field 18D, 18I, 18K, 18M**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
MEASUREMENT OF THE LIVERMORE POOL-TYPE REACTOR (LPTR) TRANSFER FUNCTION USING REACTOR OSCILLATION TECHNIQUES,
by Charles L. Cowan. 30 Mar 65, 26p
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Research reactors, Functions).

UNC-5092 **Field 18D, 18K**
CFSTI Prices: HC$4.00 MF$0.75
United Nuclear Corp., White Plains, N. Y. Development Div.
SURVEY OF CURRENT METHODS FOR ANALYSIS OF FAST REACTOR TRANSIENTS INCLUDING MELTDOWN,
by A. H. Kazi and B. H. Cherry. 28 Aug 64, 120p
Contract AT30-1-2832
Distribution: No limitation.

Descriptors: (*Fast reactor, Reactor safety systems), (*Reactor safety systems, Fast reactors).

UNC-5123 **Field 18K, 18J**
CFSTI Prices: HC$4.00 MF$0.75
United Nuclear Corp., White Plains, N. Y. Development Div.
SODIUM VOID COEFFICIENT OF REACTIVITY. A REVIEW AND STUDY OF ANALYTICAL WORK,
by C. W. Monroe. May 65, 126p
Contract AT (30-1)-2832,
Proj. 2190

Descriptors: (*Reactor reactivity, Sodium), (*Fast reactors, Reactor reactivity).

WAPD-T-1684 **Field 18L, 18I**
CFSTI Prices: HC$3.00 MF$0.75
Pittsburgh Univ., Pa.
A STOCHASTIC MODEL OF XENON FORMATION IN A NUCLEAR POWER REACTOR.
Master's thesis,
by Val Prescop. 1965, 62p
Contract AT (11-1)-GEN-14
Distribution: No limitation.

Descriptors: (*Xenon, Power reactors), (*Stochastic processes, Power reactors).

WAPD-T-1762 **Field 18J, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Bettis Atomic Power Lab., Pittsburgh, Pa.
A SYSTEM FOR NUCLEAR REACTOR DEPLETION COMPUTATION,
by R. J. Breen, O. J. Marlowe, and C. J. Pfeifer.
Apr 65, 20p CONF-650501-11
Contract AT (11-1)-GEN-14
Prepared for presentation at Int. Conf. of ANS Division of Math. and Computations, Argonne, Ill. May 1965. Distribution: No limitation.

Descriptors: (*Reactor lattice parameters, Programming (Computers)).

WAPD-T-1774 **Field 18I, 18K**
CFSTI Prices: HC$1.00 MF$0.50
Bettis Atomic Power Lab., Pittsburgh, Pa.
CRITICAL DIMENSIONS OF WATER REFLECTED SYSTEMS CONTAINING 235 U-H2O-ZR,
by G. P. Rutledge, F. A. Dobbe and C. H. Price.
Jun 65, 12p CONF-650602-36
Contract AT (11-1 !)-GEN-14
Presented at American Nuclear Society Annual Meeting (11th), Gatlinburg, Tenn, June 1965. Distribution: No limitation.

Descriptors: (*Reactor control, Critical assemblies), (*Critical assemblies, Buckling (Neutron density)).

WAPD-TM-333 (ADD-1) **Field 18G**
CFSTI Prices: HC$3.00 MF$0.50
Bettis Atomic Power Lab., Pittsburgh, Pa.
TIME-DEPENDENT FISSION-PRODUCT THERMAL AND RESONANCE ABSORPTION CROSS SECTIONS. DATA REVISIONS AND CALCULATIONAL EXTENSIONS,
by T. R. England. Jan 65, 51p
Contract AT (11-1)-GEN-14
Distribution: No limitation.

Descriptors: (*Fission products, Nuclear cross sections), (*Resonance absorption, Nuclear cross sections).

WAPD-TM-457 **Field 18J, 18I, 11F**
CFSTI Prices: HC$3.00 MF$0.50
Bettis Atomic Power Lab., Pittsburgh, Pa.
PROPERTIES OF A HAFNIUM CONTROL ROD AFTER EXPOSURE DURING THREE SEED LIVES IN PWR CORE 1,
by G. J. Salvaggio, J. G. Weinberg, and S. Kass.
Jun 65, 49p
Contract AT (11-1)-GEN-14
Distribution: No limitation.

Descriptors: (*Control rods, Hafnium), (*Hafnium, Radiation damage).

WCAP-3385-2 **Field 18J**
CFSTI Prices: HC$3.00 MF$0.75
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
SAXTON PLUTONIUM PROGRAM.
Quarterly progress rept. for the period ending Dec 31 64.
Jan 65, 93p EURAEC-1304
Contract AT (30-1)-3385
Distribution: No limitation.

Descriptors: (*Reactor fuel enrichment, Pressurized water reactors), (*Plutonium, Reactor fuel enrichment).

WCAP-3385-3 **Field 18J**
CFSTI Prices: HC$3.00 MF$0.50
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
SAXTON PLUTONIUM PROGRAM.
Quarterly progress rept. for the period ending Mar 31 65.
Apr 65, 54p EURAEC-1368
Contract AT (30-1)-3385
Distribution: No limitation.

Descriptors: (*Reactor fuel enrichment, Plutonium), (*Pressurized water reactors, Reactor fuel enrichment).

WCAP-6069 **Field 18K, 18J**
CFSTI Prices: HC$5.00 MF$1.00
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
BURNUP PHYSICS OF HETEROGENEOUS REACTOR LATTICES,
by Claude G. Poncelet. Jun 65, 182p
Contract AT (30-1)-3017
Distribution: No limitation.

Descriptors: (*Fuel burnup, Heterogeneous reactors), (*Heterogeneous reactors, Fuel burnup).

WCAP-6071 **Field 18K, 18J, 18L**
CFSTI Prices: HC$4.00 MF$1.00
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
EXPERIMENTALLY DETERMINED BURNUP AND SPENT FUEL COMPOSITION OF YANKEE ORE I,
by J. Jedruch and R. J. Nodvik. Jul 65. 131p
Contract AT (30-1)-3017
Distribution: No limitation.

Descriptors: (*Reactor coes, Fuel burn up), (*Reactor fuels, Power reactors).

Identifiers: Yankee atomic power reactor.

WCAP-6075 **Field 18I, 18J, 18L**
CFSTI Prices: HC$4.00 MF$1.00
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
YANKEE CORE EVALUATION PROGRAM.
Quarterly progress rept. for the period ending Mar 31 65,
comp. by M. J. Oboyle. Apr 65, 110p
Contract AT (30-1)-3017
Distribution: No limitation.

Descriptors: (*Reactor cores, Scientific research), Reactor fuels, Control rods, Reactor materials.

WT-1813 **Field 18C, 8K**
CFSTI Prices: HC$3.00 MF$0.75
Coast and Geodetic Survey, Rockville, Md. Washington Science Center.
SEISMIC EFFECTS FROM A NUCLEAR CRATERING EXPERIMENT IN BASALT.
Final rept.,
by L. M. Lowrie and W. V. Mickey. Nov 64, 64p

Rept. on proj. Danny Boy, Nevada Test Site 5 Mar 62. Distribution: No limitation.

Descriptors: (*Nuclear explosions, Cratering), (*Seismology, Nuclear explosion).

Y-1401 (rev). **Field 18D, 6R**
CFSTI Prices: HC$4.00 MF$0.75
Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.
Y-12 RADIATION SAFETY MANUAL,
ed. by P. C. McRee, C. M. West and J. D. McLendon. 24 Mar 65, 115p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Health physics, Instruction manuals), (*Radiation monitors, Industrial medicine).

19. ORDNANCE

AD-264 458 **Field 19F, 19C**
CFSTI Price: HC$2.00
Springfield Armory, Mass. Research and Development Div.
TEST OF M19 CUPOLA WITH CALIBER .50 M85 (T175) TANK MACHINE GUN,
by F. K. Wolfe. 1 Jun 61, 35p Rept. no. SA-TR-5-4003
Projs. ORD-TS2-2030, DA-502-08-034
Distribution: No limitation.

Descriptors: (*Automatic weapons, Tanks (Combat vehicles)), (*Small arms, Automatic weapons), (*Tank turrets, Automatic weapons), Cupolas, Loading, Feed mechanisms, Ejection, Firing tests (Ordnance), Test methods.

Identifiers: M-85 guns (Cal .50).

An investigation was made to study the functioning of the T175 (M85) gun when mounted in the M19 cupola; to observe loading, feeding, and ejection characteristics of ammunition; to ascertain servicing problems and recommend corrective measures; and to determine the durability of all components. Firing tests were conducted with the T175E1 gun installed in the cupola and 2,339 rounds were fired. Firing tests were conducted with the T175E2 gun installed in the cupola and 9,363 rounds were fired. These tests were made under simulated service conditions. Limited ammunition box capacity of 200 rounds not only restricts the tactical value of the high firing rate but also reduces the potential of the weapon for each engagement. Test procedure is described, and results discussed. (Author)

LA-3235 **Field 19D**
CFSTI Prices: HC$4.00 MF$0.75
Los Alamos Scientific Lab., Univ. of California, N. Mex.
THE TWO-DIMENSIONAL HYDRODYNAMIC HOT SPOT. VOLUME II,
by Charles L. Mader. 20 Nov 64, 127p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Explosive materials, Organic nitrogen compounds), (*Organic nitrogen compounds, Shock waves).

Identifiers: Nitromethane.

LA-3249 **Field 19D**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
EVALUATION OF HIGH EXPLOSIVE BY PYROLYSIS,
by John F. Baytos. Dec 64, 22p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Explosive materials, Pyrolysis).

N65-24358 **Field 19D, 4B**
CFSTI Prices: HC$2.00 MF$0.50
Army Electronics Research and Development Activity, White Sands Missile Range, N. Mex.
METEOROLOGICAL DATA REPORT. AEROBEE NASA 127 UA (S/W AF 142),
by Marjorie McLardie Hoidale. May 65, 41p
ERDA-310
Proj. 1V6 50212D127,
Task 1V6 50212D127 02
NASA CR-62875
Distribution: No limitation.

Descriptors: (*Meteorology, Exterior ballistics), (*Exterior ballistics, Meteorology).

Patent 3,209,314 **Field 19H, 5I, 20A**
SOUND BEACON.
Patent assigned to Navy,
by William A. Myers and Vaughn G. McKenney.
28 Sep 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Beacons, Underwater sound equipment), (*Underwater sound generators, Beacons), Noise generators, Transducers, Patents.

The beacon is for the production of underwater sound and is used as a practice target for training operators in the use of echo-ranging or listening equipment and as a defense against sonic-torpedo or submarine attack. In the latter use, the device is towed by a vessel. The device consists of a hollow cylinder containing a power source, an oscillator and an amplifier. It is also provided with a transducer and a buoyancy control.

Patent 3,211,057 **Field 19A, 9A**
MAGNETIC LOW FREQUENCY BAND PASS FILTER.
Patent assigned to Navy,
by Edward A. White, Jr. and Rodney E. Grantham.
12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Electromagnetic fuzes, Band-pass filters), (*Band-pass filters, Low frequency), (*Low-pass filters, Band-pass filters), Bombs, Electromagnetic shielding, Transformers, Patents.

The system solves the problem of communication between the pilot in an aircraft and a fall-free bomb attached to the aircraft. A transformer core is utilized which is separated into two portions which are positioned in alighment on opposite sides of the RF shield. A low frequency oscillator or pulsed D.C. power source is connected to a primary winding, which when energized transmits pulse communication through the shield to a secondary winding on the other part of the transformer core. The secondary winding is connected to an electroexplosive device within the bomb. The RF shield thus acts as a shunt to high frequency electromagnetic energy, while the combination of the RF shield interposed portions of the transformer core acts as a low frequency band pass filter.

Patent 3,211,092 **Field 19H, 17F**
ANTIMINE WEAPON.
Patent assigned to Navy,
by Donald F. Smith. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Underwater object locators, Underwater mines), (*Mine clearance, Explosive materials), (*Mines (Ordnance), Detection), Magnets, Mine warfare, Patents.

The antimine weapon assembly includes a permanent magnet arrangement and a demolition charge adapted to be detonated by the shorting out of the North and South poles of the permanent magnet arrangement resulting in the formation of a keeper circuit therewith, wherein each assembly is arranged to be magnetically attracted to a mine having a substantial ferrous content, cling to the outer surface of the mine and destroy the same when the ferrous content of the mine is of sufficient magnitude to provide a keeper effect for shorting out the North and South poles of the permanent magnet arrangement portion of the assembly, firing the demolition charge, and thereby destroying the mine.

Patent 3,211,097 **Field 19A**
PYROGEN SQUIB.
Patent assigned to Navy,
by Kenneth R. Foote. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Explosive initiators, Pyrotechnics), (*Pyrotechnics, Explosive initiators), Flares, Smoke generators, Rocket motors, Patents.

The pyrogen squib is used for the ignition of pyrotechnic and propellant compositions, such as flares, smoke generators, rocket motors and the like. A self-contained ignition assembly is combined with a grain and nozzle plate inside a hermetically sealed case or body, which combination is capable of igniting most pyrotechnic and propellant formulations without aid from additional ignition materials.

Patent 3,212,436 **Field 19H**
SUB FLOATING DRIFTING MINE.
Patent assigned to Navy,
by Louis Michelson. 19 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Underwater mines, Flotation), Floating bodies, Release mechanisms, Jettisonable equipment, Patents.

A volume changing apparatus is employed for maintaining a mine at a constant depth of submergence. A time delay anchor releasing apparatus is provided and apparatus for jettisoning a measured amount of liquid from the mine case when conditions warrant reduction of the weight of the mine. A novel electrolytic jettisoning device is employed.

Patent 3,212,440 **Field 19A**
MOLDED CASELESS SMALL ARMS AMMUNITION.
Patent assigned to Army,
by Joseph B. Quinlan, Marvin E. Levy andEarl F. Van Artsdalen. 19 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Ammunition, Small arms), (*Small arms, Ammunition), Projectiles, Patents.

The configuration of the small arms ammunition provides savings of weight of about 40 percent over a similar sized metal cased round. A molded propellant has the usual projectile adhesively secured in a recess thereof. A combustible primer is mounted in a rearward recess in the molded mass.

Patent 3,215,041 **Field 19F**
STRAIN LOCKED NOZZLE FOR RECOILLESS WEAPONS.
Patent assigned to Army,
by Francis W. Dietsch and Andrew J. Grandy.
2 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Nozzles, Recoilles guns), (*Recoilless guns, Nozzles), Projectiles, Patents.

The nozzle is attached to a projectile having stabilizing fins which is fired from a breechless, recoilless gun. The nozzle is detachably connected to the projectile and may be reused. The nozzle structure and configuration is such that it is locked against ejection by the rearwardly moving stream of igneous gases.

Patent 3,215,112 **Field 19H**
APPARATUS AND METHODS FOR SWEEPING MINES.
Patent assigned to Navy,
by Elmer A. Beck, Jr. 2 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Minesweepers, Underwater equipment), Underwater mines, Ocean bottom, Pressure, Towed vehicles, Patents.

The apparatus is designed to sweep the ocean bottom to fire pressure-actuated mines planted on the ocean floor and designed to be fired in response to ambient pressure resulting when a ship passes near the mine. A sled is towed along the ocean floor by a surface vessel. Nozzles are supported by the sled and sea water is pumped by apparatus associated with the ship through the nozzles at a rate to create a pressure signature capable of activating the mine.

Patent 3,215,932 **Field 19A, 14B**
METHOD FOR PROJECTILE VELOCITY MEASUREMENT.
Patent assigned to Air Force,
by Samuel E. Sims, William A. Northington, William Toole and James R. Milam. 2 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Projectiles, Velocity), (*Velocity, Meters), Patents, Measurement, Electromagnetism.

The projectile velocity measuring apparatus is of the electromagnetic type. The projectile is magnetized while in motion in coaxial spaced relation with sensor loops. An electrical pulse is generated in each sensor loop by the passage of the projectile through the successive loops from which time interval the velocity of the projectile can be determined.

Patent 3,215,933 **Field 19A, 14B**
SCREENS FOR USE IN A SMALL PROJECTILE VELOCITY MEASURING SYSTEM.
Patent assigned to Army,
by John J. Scanlon, Jr. 2 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Projectiles, Velocity), (*Velocity, Meters), Patents, Paper, Design, Electric insulation, Electrical conductance, Coatings, Timing devices.

Identifiers: Screens.

The device for measuring the velocity of a projectile includes a pair of spaced apart frames, a pair of conductive screens attached to each frame, each pair of screens being spaced apart less than the length of the projectile being measured, a timing device for measuring the time for the projectile travel between the pairs of frames and circuits associated with the timer. The screens are made of an onion-skin type thin paper coated on one side with a conductive paint and on the other with a plastic electrical insulating coating.

PNE-302 **Field 19D, 18C**
CFSTI Prices: HC$1.50 MF$1.00
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
EMPLACEMENT AND FIRING OF HIGH-EXPLOSIVE CHARGES AND CRATER MEASUREMENTS.
Final rept.,
by A. D. Rooke, Jr. and L. K. Davis. Feb 65, 128p
Distribution: No limitation.

Descriptors: (*Cratering, Underground explosions), (*Explosion, Cratering).

PNE-501F **Field 19D, 18C**
CFSTI Prices: HC$0.50 MF$0.50
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
STEM DESIGN AND SHOTCRETE, GROUT, AND CONCRETE SUPPORT.
Final rept.,
by Kenneth L. Saucier. Nov 64, 50p
Contract AT (29-2)-752
Rept. on proj. pre-SCHOONER, Nevada Test Site, Feb 64. Distribution: No limitation.

Descriptors: (*Cratering, Underground explosions), (*Explosions, Cratering).

PNE-601F **Field 19D, 18C**
CFSTI Prices: HC$3.00 MF$0.75
Army Engineering Nuclear Cratering Group, Livermore, Calif.
APPARENT CRATER STUDIES,
by Joseph L. Spruill. Mar 65, 66p
Rept. on proj. DUGOUT, Nevada test site, 24 Jun 64. Distribution: No limitation.

Descriptors: (*Cratering, Underground explosions), (*Explosions, Cratering).

20. PHYSICS

ANL-6960 **Field 20L, 11B, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
KATHAROMETRIC AND RESISTIVITY STUDIES OF PuO2-x EQUILIBRIA,
by Leon M. Atlas, and Gilbert J. Schleman. Mar 65, 25p
Contract W-31-109-eng-38
Distribution: No limitation.

Descriptors: (*Plutonium compounds, Dioxides), (*Thermal conductivity, Plutonium compounds), (*Resistance (Electrical), Plutonium compounds).

Identifiers: Plutonium dioxide.

ANL-6967 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
A STUDY OF CONVECTIVE MAGNETOHYDRODYNAMIC CHANNEL FLOW,
by Ralph M. Singer. Mar 65, 45p
Contract W-31-109-eng-38
Distribution: No limitation.

Descriptors: (*Magnetohydrodynamics, Transport properties).

BNL-927 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
OPTICAL MODEL ANALYSIS OF ELASTIC AND INELASTIC SCATTERING OF NEUTRONS BY ALUMINUM IN THE MEV REGION,
by S. O. Moore. Jun 65, 13p BNL-T-383
Contract AT (30-2)-GEN-16
Distribution: No limitation.

Descriptors: (*Neutron scattering, Aluminum), (*Neutron cross sections, Neutron scattering).

C13.46-318 **Field 20N, 4A, 17B, 9D**
CFSTI Price: MF$0.75
Central Radio Propagation Lab., National Bureau of Standards, Boulder, Colo.
A NUMERICAL REPRESENTATION OF CCIR REPORT 322 HIGH FREQUENCY (3-30 MC/S) ATMOSPHERIC RADIO NOISE DATA.
Technical note,
by Donald L. Lucas and John D. Harper, Jr. 5 Aug 65, 107p Rept. no. TN-318
Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.55.
Distribution: No limitation.

Descriptors: (*Atmospherics, High frequency), (*High frequency, Atmospherics), (*Radio interference, Atmospheric), Meteorological phenomena, Atmospheric electricity, Precipitation static, Distribution, Maps, Numerical analysis, Computers, Global communication system, Radio communication systems, Radio waves, Propagation.

Geographic and frequency dependent distributions of atmospheric noise power enumerated in CCIR Report 322 (1964) are approximated by series expansions for use in electronic computers. Coefficients of Fourier series representation of worldwide geographic dependence and power series representation of both mean and decile variability of the frequency dependence are tabulated. Representative contour charts of all distributions are shown along with sample longitudinal and latitudinal variations. (Author)

C13.46-319 **Field 20N, 12A**
CFSTI Price: MF$0.75
Central Radio Propagation Lab., National Bureau of Standards, Boulder, Colo.
NUMERICAL VALUES OF THE PATH INTEGRALS FOR LOW AND VERY LOW FREQUENCIES.
Technical note,
by Leslie A. Berry and Mary E. Chrisman. 2 Sep 65, 111p Rept. no. TN-319
Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.55.

Descriptors: (*Radio frequency, Numerical analysis), (*Radio waves, Electromagnetic wave reflections), (*Graphics, Integrals), Ionospheric propagation, Very low frequency, Low frequency.

Identifiers: Path integrals.

Numerical values of the path integrals for the first five hops are given as a function of distance from 1000 km to 8000 km, for frequencies of 10, 20, 30, 60, 100, 150, and 200 kHz., for sea paths, and for land paths with conductivities of 0.01 and 0.001 mhos/m, assuming reflection heights of 60, 70, 80, 90, and 100 km. For convenience, ground wave curves for the same parameters are given. Using these values, and any ionospheric reflection coefficients, the individual time modes, and the total field can be calculated simply. The calculation is valid near the caustic and in the shadow region. The path integrals can also be used to extract ionospheric reflection coefficients from experimental data. (Author)

CALT-68-32 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
California Inst. of Tech., Pasadena.
ROLE OF NON-COMPACT GROUPS,
by Yuval Neeman. 1965, 5p CONF-650106-8
Contract AT (11-1)-68
Presented at the Conference on Symmetry Principles at High Energy, Coral Gables, Fla., 20-22 Jan 1965. Distribution: No limitation.

Descriptors: (*Quantum mechanics, Groups (Mathematics)), (*Elementary particles, Momentum).

CEAL-1022 **Field 20G**
CFSTI Prices: HC$2.00 MF$0.50
Cambridge Electron Accelerator, Mass.
BEAM MONITOR. CALIBRATION MEASUREMENTS WITH 6-GEV EXTERNAL ELECTRON BEAM OF THE CAMBRIDGE ELECTRON ACCELERATOR,
by James De Pagter and Mircea Fotino. 30 Jun 65, 29p CONF-650636-2
Contract AT (20-1)-2076
Presented at International Symposium on Electron and Photon Interactions at High Energies, Hamberg, Germany 8-12 Jun 1965. Distribution: No limitation.

Descriptors: (*Electron beams, Monitors), (*Monitors, Calibration).

CONF-640507 **Field 20D**
CFSTI Prices: HC$5.50 MF$2.50
Division of Reactor Development (AEC), Washington, D. C. Engineering Development Branch.
PROCEEDINGS OF THE JOINT USAEC-EURATOM TWOPHASE FLOW MEETING (2nd), HELD AT USAEC, GERMANTOWN, MARYLAND, 29 APR-1 MAY 1964,
ed. by Ronald M. Scroggins. Nov 64, 546p
Distribution: No limitation.

Descriptors: (*Two-phase flow, Symposia).

CU-1932-245 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Nevis Labs., Columbia Univ., Irvington-on-Hudson, N. Y.
ANNIHILATION OF ANTIPROTONS IN HYDROGEN AT REST. III. THE REACTIONS AN TI P AND P YIELDS OMEGA ZERO AND PI PLUS AND PI MINUS AND ANTI P AND P YIELDS OMEGA ZERO AND RHO ZERO,
by C. Baltay, P. Franzini, G. Luetjens, J. C. Severiens, and D. Tycko. Jul 65, 15p NEVIS-139R-511CU-245
Contract AT (30-1)-1932
Distribution: No limitation.

Descriptors: (*Annihilation reactions, Antiprotons), (*Antiprotons, Hydrogen).

GEAP-4863 **Field 20D, 20M**
CFSTI Prices: HC$1.00 MF$0.50
General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
TWO-PHASE FLOW AND HEAT TRANSFER IN MULTIROD GEOMETRIES.
Quarterly progress rept. no. 2, 26 Jan-25 Apr 65, May 65, 15p
Contract AT (04-3)-189
Distribution: No limitation.

Descriptors: (*Two-phase flow, Measurement), (*Heat transfer, Measurement).

IDO-17087 **Field 20H, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
A MACHINE PROGRAM FOR CALCULATING SLOW NEUTRON SCATTERING CROSS SECTIONS WITH EXACT AVERAGING OVER MOLECULAR ORIENTATION,
by L. J. Gannon and H. L. McMurry. May 65, 17p
Contract AT (10-1)-205
Distribution: No limitation.

Descriptors: (*Neutron cross sections, Thermal neutrons), (*Programming (Computers), Neutron cross sections).

IDO-17089 **Field 20H, 18K**
CFSTI Price: HC$1.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
SLOW NEUTRON SCATTERING STUDIES OF LIQUID AND SOLID ARGON,
by P. D. Randolph. May 65, 22p
Contract AT (10-1)-205
Distribution: No limitation.

Descriptors: (*Neutron scattering, Argon), (*Thermal neutrons, Inelastic scattering).

IS-1141 **Field 20B**
CFSTI Prices: HC$6.00 MF$1.25
Ames Lab., Iowa.
THE REDUCED CELL AND ITS CRYSTALLOGRAPHIC APPLICATIONS,
by Stephen L. Lawton and Robert A. Jacobson. Apr 65, 208p
Contract W-7405-eng-82
Distribution: No limitation.

Descriptors: (*Crystal lattices, Crystal substructure), (*Crystal substructure, Symmetry (Crystallography).

IS-1156 **Field 20M, 20H**
CFSTI Prices: HC$2.00 MF$0.50
Ames Lab., Iowa.
A TABULATION OF THE SPECIFIC HEAT CONTRIBUTION DUE TO THERMAL EXCITATION (SCHOTTKY EFFECT) OF THE 4F ELECTRONS OF SOME DI-AND TRI-VALENT LANTHANIDE ELEMENTS,

by David H. Dennison. May 65, 40p
Contract W-7405-eng-82
Distribution: No limitation.

Descriptors: (*Specific heat, Excitation), (*Excitation, rare earth elements).

IS-1219 Field 20H, 18B
CFSTI Prices: HC$1.00 MF$0.50
Iowa State Univ. of Science and Tech., Ames. Inst. for Atomic Research.
DESIGN CONSIDERATIONS FOR A SYSTEM TO INVESTIGATE SHORT-LIVED NUCLEI PRODUCED AT A REACTOR,
by W. L. Talbert, Jr., and David Thomas. 1964, 20p CONF-650627-2
Contract W-7405-eng-42
Presented at Conference on Electromagnetic Isotope Separators and Related ion accelerators, and their applications to physics, aarhus, Denmark. Distribution: No limitation.

Descriptors: (*Nuclei, Radioactive decay), (*Isotope separation, Nuclear reactors), (*Radioactive isotopes, Scientific research).

LA-3309 Field 20B, 9B
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
AN INTEGRATED SERIES OF CRYSTALLOGRAPHIC COMPUTER PROGRAMS. VII. INTERATOMIC DISTANCE AND ANGLE CALCULATIONS,
by A. C. Larson, B. B. Roof, Jr., and D. T. Cromer. Jan 65, 41p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Crystal structure, Programming (Computers)), (*Crystal substructure, Programming (Computers)), (*Single crystals, Atoms).

Identifiers: FORTRAN II, FAP.

LA-3310 Field 20B, 9B
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. California, N. Mex.
AN INTEGRATED SERIES OF CRYSTALLOGRAPHIC COMPUTER PROGRAMS. VIII. THERMAL ELLIPSOID ORIENTATION,
by Allen C. Larson, R. B. Roof, Jr., andDon T. Cromer. Nov 64, 29p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Crystal structure, Programming (Computers)), (*Single crystals, Atoms).

Identifiers: FORTRAN II.

LA-3315 Field 20H
CFSTI Prices: HC$3.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
THE APPROXIMATE DOPPLER BROADENING OF AN ISOLATED NUCLEAR RESONANCE,
by Joseph J. Devaney. Mar 65, 39p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Nuclear resonance, Doppler effect), (*Doppler effect, Nuclear resonance).

LA-3320-MS Field 20I, 20H
CFSTI Prices: HC$4.00 MF$0.75
Los Alamos Scientific Lab., Univ. of California, N. Mex.
SEMIANNUAL STATUS REPORT OF THE LASL CONTROLLED THERMONUCLEAR RESEARCH PROGRAM FOR PERIOD ENDING APRIL 30, 1965.
May 65, 108p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Thermonuclear reactions, Control).

LA-3322 Field 20H
CFSTI Price: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
BIBLIOGRAPHY OF CROSS SECTION AND SCATTERING DATA FOR THE REACTIONS D PLUS D AND T PLUS D,
by R. V. Winsor. 9 Mar 65, 14p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Deuteron reactions, Deuteron cross sections), (*Triton bombardment, Bibliographies).

LA-3334 Field 20I
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
A MEASUREMENT OF THE ELECTRON DENSITY OF THE DENSE PLASMA FOCUS BY SCHLIEREN PHOTOGRAPHY,
by J. W. Mather. 14 May 65, 10p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Plasma medium, Electron density), (*Schlieren photography, Plasma medium).

LA-3342 Field 20L
CFSTI Prices: HC$3.00 MF$0.75
Los Alamos Scientific Lab., Univ. of California, N. Mex.
A REVIEW OF QUASIPARTICLE AND JOSEPHSON TUNNELING IN SUPERCONDUCTORS,
by Robert Brout. Oct 64, 56p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Tunneling (Electronics), Superconductors), (*Superconductors, Tunneling (Electronics)).

LA-3349 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
DIFFUSION OF NEUTRONS FROM A POINT SOURCE IN AN EXPONENTIAL ATMOSPHERE,
by Marshall Rosenbluth. 1 Jun 56, 9p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Neutron transport theory, Mathematical analysis).

MATT-320 Field 20I
CFSTI Prices: HC$2.00 MF$0.50
Princeton Univ., N. J. Plasma Physics Lab.
THE RELATIONSHIP BETWEEN RESISTIVE INSTABILITIES AND MICROINSTABILITIES IN INHOMOGENEOUS PLASMAS,
by T. E. Stringer. May 65, 32p
Contract AT (30-1)-1238
Distribution: No limitation.

Descriptors: (*Plasma medium, Stability).

MIT-2098-125 Field 20H, 9B
CFSTI Prices: HC$1.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge.
A PHOTOPRODUCTION EXPERIMENT USING A SMALL COMPUTER.
by R. Alvarez, V. Elings, Z. Bar-Yam, D. Garelick, and R. Fessel. 22 Mar 65, 10p CONF-650510-1
Contract AT (30-1)-2098
Presented at Purdue Conference on Instrumentation for High Energy Physics, Lafayette, Ind. Prepared in Cooperation with Cambridge Electron Accelerator, Mass. Distribution: No limitation.

Descriptors: (*Gamma-proton reactions, Pions), (*Computers, Gamma counters).

ML-767 Field 20G
CFSTI Prices: HC$3.00 MF$0.75
Microwave Lab., Stanford Univ., Calif.
MEASUREMENT TECHNIQUES FOR PERIODIC STRUCTURES,
by W. J. Gallagher. Nov 60, 61p
Contract AT (04-3)-21
Distribution: No limitation.

Descriptors: (*Particle accelerator techniques, Measurement), (*Particle accelerator components, Structures).

N65-15375 Field 20K
CFSTI Prices: HC$2.00 MF$0.50
Lehigh Univ., Bethlehem, Pa.
ON THE PREDICTION OF SOME RANDOM LOADING CHARACTERISTICS RELEVANT TO FATIGUE,
by F. P. Beer, P. C. Paris, and J. R. Rice. Apr 64, 42p
Contract NSG410
NASA CR-56152
Presented at the Intern. Conf. on Acoust. Fatigue, 2D Dayton, Ohio, 29 Apr-1 May 1964. Distribution: No limitation.

Descriptors: (*Fatigue (Mechanics), Loading (Mechanics)), (*Mathematical prediction, Loading (Mechanics)).

N65-16474 Field 20F, 11C
CFSTI Prices: HC$1.00 MF$0.50
IIT Research Inst., Chicago, Ill. Technology Center.
INVESTIGATION OF LIGHT SCATTERING IN HIGHLY REFLECTING PIGMENTED COATINGS.
Letter rept. Jan 1-Mar 1 64,
by G. A. Zerlaut. 13 Mar 64, 6p IITRI-C6018-7
Contract NASR6507
Distribution: No limitation.

Descriptors: (*Light, Scattering), (*Coatings, Optical properties).

N65-16834 Field 20K
CFSTI Prices: HC$2.00 MF$0.50
Republic Aviation Corp., Farmingdale, N. Y.
THE HAMILTON-JACOBI FORMULATION OF THE RESTRICTED THREE BODY PROBLEM IN TERMS OF THE TWO FIXED CENTER PROBLEM,
by M. Payne. 19 Jun 62, 40p RAC-720-2, ARD-896-451
Contract NAS82605
NASA CR-51736
Distribution: No limitation.

Descriptors: (*N-body problem, Analysis).

Identifiers: Restricted three body problem.

N65-17517 Field 20H, 20G, 18H
CFSTI Prices: HC$1.00 MF$0.50
TRW Space Technology Labs., Redondo Beach, Calif.
LOW ENERGY PROTON EXPERIMENTS.
Monthly progress report, period ending 1 Jan 65,
by R. G. Downing. 20 Jan 65, 3p STL-4161-6009-SU-000
Contract NAS53805
NASA CR-60879
Distribution: No limitation.

Descriptors: (*Protons, Radiation damage), Proton bombardment, Proton accelerators, Van DeGraaff generators.

N65-17520 Field 20L
CFSTI Prices: HC$3.00 MF$0.75
Research Triangle Inst., Durham, N. C. Solid State Lab.
DIFFUSION PROCESS MODELING.
Technical summary rept. for May-Dec 64,
by Robert P. Donovan. Jan 65, 63p
Contract NAS8 11243
Distribution: No limitation.

Descriptors: (*Semiconductors, Diffusion), (*Silicon, Diffusion).

N65-17533 Field 20F, 11C
CFSTI Prices: HC$2.00 MF$0.50
IIT Research Inst., Chicago, Ill.
INVESTIGATION OF LIGHT SCATTERING IN HIGHLY REFLECTING PIGMENTED COATINGS.
Quarterly rept. 1 Nov 64-1 Feb 65,
by S. Katz, B. H. Kaye, and G. A. Zerlaut. 1965, 28p IITRI-C6018-13
Contract NASR6507
NASA CR-60884
Distribution: No limitation.

Descriptors: (*Light, Scattering), (*Coatings, Reflection).

N65-19684 Field 20M
CFSTI Prices: HC$3.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
CONVECTIVE HEAT TRANSFER IN A CONVERGENT DIVERGENT NOZZLE,
by L. H. Back, P. F. Massier and H. L. Gier. 15 Feb 65, 56p JPL-TR-32-415
Contract NAS7100
NASA CR-57326
Distribution: No limitation.

Descriptors: (*Convergent divergent nozzles, Heat transfer), (*Heat transfer, Convection (Heat transfer)).

N65-19751 Field 20K
CFSTI Prices: HC$1.00 MF$0.50
Midwest Research Inst., Kansas City, Mo.
RATIONAL APPROXIMATIONS TO THE RESPONSE OF A DYNAMIC SYSTEM DESCRIBED BY A NONLINEAR DIFFERENTIAL EQUATION.
Final rept. 15 Jan 64-14 Jan 65,
by Wyman Fair and Yudell L. Luke. 1965, 18p
Contract NASr63 (07),
Proj. 2760P
NASA CR-57343
Distribution: No limitation.

Descriptors: (*Structural shells, Dynamics), (*Nonlinear differential equations, Dynamics).

N65-20409 Field 20G
CFSTI Prices: HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A STUDY OF ELECTRICAL DISCHARGE IN LOWPRESSURE AIR,
by M. Edmund Ellion. 1 Apr 65, 17p JPL-TR-32-678
Contract NAS7100
NASA CR-57646
Distribution: No limitation.

Descriptors: (*Electric discharge, Air), (*Low-pressure research, Electric discharges).

N65-20424 Field 20D
CFSTI Prices: HC$2.00 MF$0.50
Lockhead Missiles and Space Co., Huntsville, Ala. Research and Engineering Center.
A REVIEW OF SELECTED METHODS OF PREDICTING BASE FLOW ENVIRONMENT IN SUPERSONIC FLOW,
by T. O. Ying. Jul 64, 33p H-64-008, LMSC/HREC-A036435
Contract NAS8 11148
NASA CR-57616
Distribution: No limitation.

Descriptors: (*Base flow, Supersonic flow), (*Supersonic flow, Base flow).

N65-26047 Field 20K
CFSTI Prices: HC$5.00 MF$1.00
Republic Aviation Corp., Farmingdale, N. Y.
STRESS ANALYSIS OF A DOUBLY-CURVED SKIN WITH A FLARED NOZZLE PORT PHASE V.
Annual summary rept.,
by I. U. Ojalvo, M. Newman, M. Goldberg and N. Levine. 15 May 65, 177p RAC-1452-6
Contract NAS8 2698
NASA CR-63228
Distribution: No limitation.

Descriptors: (*Pressure vessels, Stresses), (*Nozzles, Stresses).

N65-26048 Field 20K
CFSTI Prices: HC$1.00 MF$0.50
Republic Aviation Corp., Farmingdale, N. Y.
STRESS ANALYSIS OF A DOUBLY-CURVED SKIN WITH A FLARED NOZZLE PORT, PHASE V.
User's Manual,
by I. U. Ojaluo. 15 May 65, 28p RAC-1452-7
Contract NAS8 2698
NASA CR-63229
Distribution: No limitation.

Descriptors: (*Pressure vessels, Stresses), (*Nozzles, Stresses).

N65-26401 Field 20F, 17B, 17H
CFSTI Prices: HC$3.00 MF$0.75
Sylvania Electric Products, Inc. Waltham, Mass. Applied Research Lab.
DEVELOPMENT OF AN OPTICAL SUPERMETERODYNE RECEIVER.
Summary rept. Mar 64-Mar 65,
by R. L. Lucy. 17 May 65, 97p F-4065
Contract NAS8 11588
NASA CR-63393
Distribution: No limitation.

Descriptors: (*Demodulators, Optical equipment), (*Optical equipment, Demodulators).

Identifiers: Optical receivers.

N65-27274 Field 20L
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EMPIRICAL EQUATIONS FOR ELECTRON BACK SCATTERING COEFFICIENTS,
by Kenneth F. Koral and Allan J. Cohen. Jul 65, 18p
NASA TND-2909
Distribution: No limitation.

Descriptors: (*Electrons, Scattering), (*Equations, Scattering), Metals.

N65-27294 Field 20F
CFSTI Prices: HC$2.00 MF$0.50
Bausch and Lomb, Inc., Rochester, N. Y.
GRATING GROOVE FORMATION IN Au AND Au-Ge ALLOYS.
Final rept. 1964,
by C. Frank Mooney. 26 Mar 65, 48p
Contract Nonr4277 (00) (X)
NASA CR-63480
Distribution: No limitation.

Descriptors: (*Diffraction gratings, Metal films), (*Gold, Metal films), (*Gold alloys, Germanium alloys).

N65-27474 Field 20N, 9C
CFSTI Prices: HC$3.00 MF$0.75
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
AN INVESTIGATION OF A METHOD OF DETERMINING ANTENNA PARAMETERS BY SCATTERING CROSS SECTION MEASUREMENTS,
by S. J. Skarote. 15 May 65, 79p Rept. no. 1691-11
Grant NsG448
NASA CR-63471
Distribution: No limitation.

Descriptors: (*Antenna radiation patterns, Measurement).

N65-28098 Field 20K
CFSTI Prices: HC$2.00 MF$0.50
Alabama Univ. Huntsville. Research Inst.
ON AXIOMS FOR HETEROGENEOUS CONTINUA,
by A. A. Hayday. May 65, 26p UARI-23
Contract Nonr-1858 (25); Grant NsG-381, Proj. Squid
NASA CR-63787
Distribution: No limitation.

Descriptors: (*Continuum mechanics, Mathematical models).

N65-29298 Field 20K
CFSTI Prices: HC$3.00 MF$0.50
Martin Co., Baltimore, Md.
ANALYTICAL AND EXPERIMENTAL INVESTIGATION OF PRESSURIZED TOROIDAL SHELLS.
Final rept.,
by P. F. Jordan. Jul 65, 63p Research rept. no. RR-64
Contract NASw913
NASA CR-261
Distribution: No limitation.

Descriptors: (*Bodies of revolution, Structural shells), (*Structural shells, Pressure).

Identifiers: Toroidal shells.

N65-32396 Field 20I, 12A
CFSTI Prices: HC$3.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
MONTE CARLO METHOD FOR THE CALCULATION OF TRANSPORT PROPERTIES IN A LOW-DENSITY IONIZED GAS,
by Charles M. Goldstein. Sep 65, 57p
NASA TND-2959
Distribution: No limitation.

Descriptors: (*Plasma physics, Transport properties), (*Transport properties, Determination), (*Monte Carlo method, Transport properties).

N65-32649 Field 20K
CFSTI Prices: HC$3.00 MF$0.50
Dynatech Corp., Cambridge, Mass.
FLEXURAL VIBRATIONS OF THE PRESTRESSED TOROIDAL SHELL,
by Artis A. Liepins. Sep 65, 49p
Contract NASw955
NASA CR-296
Distribution: No limitation.

Descriptors: (*Structural shells, Vibration).

N65-32878 **Field 20F, 17B**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
EFFECT OF ELECTRON RADIATION ON TV LENS COMPONENTS,
by Lawrence Kobren. Sep 65, 10p
NASA TND-2919

Distribution: No limitation.

Descriptors: (*Camera lenses, Electron bombardment), (*Electron bombardment, Camera lenses), Television equipment.

N65-33354 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
ON FREE VIBRATIONS OF ECCENTRICALLY STIFFENED CYLINDRICAL SHELLS AND FLAT PLATES,
by Martin M. Mikulas, Jr., and John A. McElman. Sep 65, 25p
NASA TND-3010
Distribution: No limitation.

Descriptors: (*Stiffened cylinders, Vibration), (*Flat plate models, Vibration), Cylindrical bodies.

N65-33356 **Field 20M, 14B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
PRESSURE AND CONVECTIVE HEAT-TRANSFER MEASUREMENTS IN A SHOCK TUNNEL USING SEVERAL TEST GASES,
by Joseph G. Marvin and Clifford M. Akin. Sep 65, 30p
NASA TND-3017
Distribution: No limitation.

Descriptors: (*Heat transfer, Measurement), (*Shock tubes, Heat transfer).

NAA-SR-MEMO-4967 **Field 18I, 18L, 18K**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
PERFORMANCE REQUIREMENTS FOR HALLAM CONTROL RODS,
by R. L. Detterman. 17 Mar 60, 30p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Control rods, Reactor operation), (*Reactor theory, Control rods).

NAA-SR-MEMO-7438 **Field 18J, 07A, 11F, 18G**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
EQUIPMENT FOR FABRICATION AND ENCAPSULATION OF IRRADIATED UO2 PELLETS,
by J. E. Bodine, J. Guon, R. J. Sullivan, D. E. Stanwood, and F. W. Gandolfo. 22 May 62, 36p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Reactor fuels processing, Powders), (*Uranium compounds, Reactor fuels), Oxides, Encapsulation.

NAA-SR-11150 **Field 20B**
CFSTI Prices: HC$3.00 MF$0.50
Atomics International, Canoga Park, Calif.
CALCULATIONS OF THE MADELUNG CONSTANT AND INVERSE TWELFTH POWER REPULSION FACTORS FOR THE WURTZITE CRYSTAL STRUCTURE,
by William G. Gehman. 25 Jul 65, 84p
Contract AT (11-1)-GEN-8
Distribution: No limitation.

Descriptors: (*Crystal structure, Electrical properties).

NYO-1480-1 **Field 20D, 12A**
CFSTI Prices: HC$3.00 MF$0.75
AEC Computing and Applied Mathematics Center, New York Univ., N. Y.
NUMERICAL COMPUTATION OF HYPERSONIC FLOW PAST A TWO-DIMENSIONAL BLUNT BODY,
by Eva V. Swenson. 15 Aug 64, 65p
Contract AT (30-1)-1480
Distribution: No limitation.

Descriptors: (*Hypersonic flow, Numerical analysis).

ORNL-P-1336 **Field 20H, 20G**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
CHANNELING EFFECTS ON THE ENERGY LOSS OF HIGH ENERGY (20-80 MEV) 79 BRAND 127 I IONS IN GOLD,
by S. Datz, T. S. Noggle, and C. D. Moak. 1965, 25p CONF-650627-1
Contract W-7405-eng-26
Presented at the Conference on Electromagnetic Isotope Separators and related ion accelerators, and their applications to physics, Aarhus, Denmark. Distribution: No limitation.

Descriptors: (*Particle trajectories, Ion accelerators), (*Crystal lattices, Particle trajectories).

ORNL-TM-1153 **Field 20H, 20L**
CFSTI Prices: HC$4.00 MF$0.75
Oak Ridge National Lab., Tenn.
LOW ENERGY ELECTRON AND PROTON TRANSMISSION IN ALUMINUM AND SILVER.
Master's thesis,
by Floyd Wayne Garber. Aug 65, 117p
Contract W-7405-eng-26
Submitted to University of Tennessee. Distribution: No limitation.

Descriptors: (*Silver, Proton bombardment), (*Aluminum, Proton bombardment), Electron bombardment.

ORNL-3778 **Field 20C, 7D, 20H**
CFSTI Prices: HC$6.00 MF$1.25
Oak Ridge National Lab., Tenn.
PHYSICS DIVISION.
Annual progress rept for period ending 31 December 64,
May 65, 202p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Physics, Abstracting).

ORNL-3800 **Field 20H, 20G**
CFSTI Prices: HC$4.00 MF$0.75
Oak Ridge National Lab., Tenn.
ELECTRONUCLEAR DIVISION.
Annual progress rept. for period ending 31 Dec 64,
Jun 65, 115p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Nuclear physics, Scientific research).

ORNL-3841 **Field 20L, 18H, 11F, 18J**
CFSTI Prices: HC$4.00 MF$0.75
Oak Ridge National Lab., Tenn.
SOLID STATE DIVISION.
Annual progress rept. for period ending 31 May 65,
Jul 65, 101p
Contract W-7405-eng-26
Distribution: No limitation.

Descriptors: (*Solid state physics, Radiation damage), (*Radiation damage, Solid state physics).

Patent 3,211,937 **Field 20G, 11C**
CARBON-COATED ELECTRON-TRANSMISSION WINDOW.
Patent assigned to AEC,
by Ross E. Hester and William A. Sherwood. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Particle accelerator components, Foils), (*Foils, Transport properties), (*Transport properties, Electron beams), Patents, Carbon, Coatings, Aluminum compounds, Oxides, Thickness, Metal films.

A foil window is provided whereby an electron beam of the order of hundreds of amperes at 5 mev is transmitted from a low-pressure to a high-pressure region. Carbon is coated on a foil, namely, aluminum oxide. This thin, carbon coating provides the conductivity necessary to relieve the electrical stress on the foil window without overly increasing the thickness of the window and, consequently, the scattering angle. Further, this allows, the transmitted beam to be of higher quality and intensity than was heretofore possible.

Patent 3,213,379 **Field 20G**
ABSORPTION OF ENERGY BY ROTATING DISCS IN PARTICLE BEAM DEFLECTOR.
Patent assigned to AEC,
by Richard J. Burleigh and Ralph Peters. 19 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Particle beams, Deflection), (*Particle beam components, Deflection), Cyclotrons, Electrodes, Ion accelerators, Disks, Rotation, Energy, Absorption, Patents.

A greater beam is extracted through the use of a pair of rotating thin coplanar metallic discs to form the leading edge of the septum in a cyclotron. The septum, with its rotating members, presents a continually changing area for receiving the ion bombardment at the point of separation of the outgoing beam of ions from the outer cyclotron orbit and in this manner dissipates more heat than the formerly used stationary types of septums. The increased heat removal by the septum in turn increases the amount of beam which can be extracted from the cyclotron without damage to the detector.

PB-168 559 **Field 20B**
CFSTI Prices: HC$2.00 MF$0.50
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
OBSERVATION OF DISLOCATIONS IN CRYSTALS USING X-RAY AND ELECTRON TRANSMISSION (Observation des Dislocations dans les Cristaux par Transmission des Rayons X et des Electrons),
by Jean-Pierre Morlevat. Oct 65, 29p Rept. no. CEA-R-2875
Text in French, Attached summary in English.
Distribution: No limitation.

Descriptors: (*Crystal lattice defects, Diffraction analysis), (*Diffraction analysis, Crystal lattice defects), France, X-ray diffraction analysis, Electron diffraction analysis, Theory.

Two approaches of the dynamical theory of diffraction (EWALD's and ANTHIER's) are recalled briefly. In the light of these theories, one then considers what information concerning the dislocations existing in a crystal can be obtained by X-Ray as well as electron diffraction. (Author)

PB-168 564 **Field 20H**
CFSTI Prices: HC$3.00 MF$0.75
Commissariat a l 'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
STUDY OF HYPERON-ANTIHYPERON PRODUCTION IN ANTIPROTON-PROTON COLLISION AT 4 GeV/c (Etude de la Production d'Hyperon et d'Antihyperon dans les Collisions Antiproton-Proton A 4 GeV/c).
Doctoral thesis,
by Daniel Revel. 1965, 79p Rept. no. CEA-R-2798
Text in French, attached summary in English. Distribution: No limitation.

Descriptors: (*Pair production, Hyperons), (*Antiparticles, Hyperons), Annihilation reactions, Protons, Antiprotons, Nuclear models, France.

Results are presented on hyperon-antihyperon production by 4 GeV/c protons in hydrogen. About 100,000 pictures taken in an antiproton beam from the CERN proton synchrotron with the 81 cm Saclay hydrogen bubble chamber were used. The production mechanism of hyperon antihyperon pairs and excited hyperons (or antihyperons) was studied through cross sections and angular distributions. For most of the channels, the angular distributions show a strong forward peaking of the antihyperon in the center of mass of the interaction. This suggests that a peripheral-type mechanism is predominant in these processes. The results of some cross sections are compared with theoretical predictions according to SU3 unitary symmetry. (Author)

RPI-328-18 **Field 20H, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Nuclear Engineering and Science.
EXPAND. A SET OF THREE INTERRELATED FORTRAN II PROGRAMS,
by R. L. Hobson. Nov 64, 35p
Contract AT (30-3)-328
Distribution: No limitation.

Descriptors: (*Neutron transport theory, Programming (Computers)), (*Neutron spectrum, Neutron transport theory).

RPI-328-21 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Nuclear Engineering and Science.
ASYMPTOTIC AND STEADY STATE SPECTRUM MEASUREMENTS IN A MULTIPLYING MEDIUM,
by R. J. Cerbone, E. R. Gaertiner and R. E. Slovacek. 1964, 7p
Contract AT (30-3)-328
Distribution: No limitation.

Descriptors: (*Neutron spectrum, Determination).

RPI-328-7 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Nuclear Engineering and Science.
GEOMETRICAL TRANSPORT EFFECTS IN THE SPHERICAL HARMONICS APPROXIMATION,
by T. E. Dudley and P. B. Daitch. Jun 64, 37p

Contract AT (30-3)-328
Distribution: No limitation.

Descriptors: (*Neutron transport theory, Geometry), (*Special functions (Mathematical), Neutron transport theory).

SC-RR-65-137 **Field 20L, 20C**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
PROCEDURE FOR THE ANALYSIS OF SEMICONDUCTOR FAILURES.
Apr 65, 11p
Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Semiconductors, Failure (Electronics)), (*Failure (Electronics), Semiconductors).

SC-RR-65-141 **Field 20H**
CFSTI Prices: HC$3.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
TRANSMISSION OF X RAYS THROUGH AIR,
by James H. Renken. Apr 65, 41p
Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*X-rays, Transport properties), Air, Photons, Absorption, Scattering.

SC-RR-65-307 **Field 20K, 12A**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Lab., Albuquerque, N. Mex.
SOLVING THE SECOND BOUNDARY VALUE PROBLEM OF ELASTICITY,
by Ronald O. Hultgren. Jul 65, 11p
Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Elasticity, Boundary value problems), (*Boundary value problems, Elasticity).

SC-RR-65-54 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
SPECIAL MATERIALS TESTS FOR THE HYPERSONIC PLASMA GENERATOR,
by K. J. Touryan. Mar 65, 13p
Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Plasma generators, Hypersonic flow), (*Thermionic emission, Materials), Tungsten, Carbides.

SLAC-39 **Field 20G, 20C**
CFSTI Prices: HC$2.00 MF$0.75
Stanford Linear Accelerator Center, Stanford Univ., Calif.
MAGNETIC FIELD MEASUREMENT AND SPECTROS- COPY IN MULTIPOLE FIELDS,
by J. K. Cobb and J. J. Muray. Feb 65, 83p
Contract AT (04-3)-400
Distribution: No limitation.

Descriptors: (*Linear accelerators, Magnetic fields), (*Magnetic fields, Linear accelerators).

SLAC-40 **Field 20G**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Linear Accelerator Center, Stanford Univ., Calif.
EFFECT OF NUCLEAR RADIATION ON ORGANIC MATERIALS; SPECIFICALLY MAGNET INSULATIONS IN HIGH-ENERGY ACCELERATORS,
by H. Brechna. Mar 65, 93p
Contract AT (04-3)-515
Distribution: No limitation.

Descriptors: (*Electric insulation, Radiation damage), (*Particle accelerators, Radiation damage).

SLAC-42 **Field 20G**
CFSTI Prices: HC$4.00 MF$0.75
Stanford Linear Accelerator Center, Stanford Univ., Calif.
TWO-MILE ACCELERATOR PROJECT.
Quarterly status rept. 1 Oct - 31 Dec 64.
Apr 65, 116p
Contracts AT (04-3)-400, AT (04-3)-515
Distribution: No limitation.

Descriptors: (*Linear accelerators, Electron accelerators), (*Construction, Linear accelerators).

TID-21429 **Field 20H, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Nuclear Engineering and Science.
RESPECT. RENSSELAER STEADY STATE SPECTRA,
by R. L. Hobson. Nov 64, 11p
Contract AT (30-3)-328
Distribution: No limitation.

Descriptors: (*Neutron transport theory, Programming (Computers)), (*Neutron spectrum, Neutron transport theory).

TID-21943 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Texas Univ., Austin. Plasma Physics Lab.
DAMPING AT THE LOWER HYBRID RESONANCE IN A WARM PARTIALLY IONIZED PLASMA.
Technical rept.,
by M. E. Oakes and H. Schlueter. Feb 65, 23p

Contract AT (40-1)-3110
Distribution: No limitation.

Descriptors: (*Resonance, Damping), (*Plasma physics, Resonance).

TID-22044 **Field 20H**
CFSTI Prices: HC$6.00 MF$1.25
Michigan Univ., Ann Arbor.
CROSS-OVER SIGNALS IN ATOMIC HYDROGEN.
Doctoral thesis,
by Lewis Craig Himmell. 1965, 222p
Contract AT (11-1)-1112
Submitted to the University of Michigan, 1965.
Distribution: No limitation.

Descriptors: (*Atomic energy levels, Hydrogen), (*Fluorescence, Hydrogen).

TID-4025 (Rev. 1) (Pt. 1) (Suppl. 4) **Field 20H**
CFSTI Prices: HC$7.00 MF$1.50
Division of Technical Information Extension (AEC), Oak Ridge, Tenn.
TRANSLATION TITLE LIST AND CROSS REFERENCE GUIDE,
ed. by Frances E. Stratton. Jul 65, 336p
Distribution: No limitation.

Descriptors: (*Nuclear energy, Bibliographies).

Identifiers: Atomic Energy Commission.

UCID-1165 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Berkeley.
DATA ANALYSIS FOR ASSOCIATED PRODUCTION EXPERIMENT,
by M. Alston and H. Monteros. 1 May 61, 29p
Memo. no. 165 rev.
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Pions, Proton reactions), (*Strange particles, Meson reactions).

UCRL-11995 **Field 20F, 20H**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Berkeley.

797-565 O - 66 - 17

ORTHOGONAL DISPERSION SPECTROMETER FOR MISSION MASS SPECTRA,
by C. M. Ankenbrandt, A. R. Clark, Bruce, Cork, L. T. Kerth, and W. A. Wenzel. 6 May 65, 19p CONF-650510-7
Contract W-7405-eng-48
Prepared for presentation at Purdue Conference on Instrumentation for High Energy Physics, Lafayette, Ind., 12-14 May 1965. Distribution: No limitation.

Descriptors: (*Spectrum analyzers, Mass spectroscopy), (*Mass spectroscopy, Spectrum analyzers).

UCRL-12204 **Field 20H, 20M, 20F, 20E**
CFSTI Prices: HC$3.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Livermore.
PHYSICS DEPARTMENT.
Progress rept. for Jul-Sep 64,
by A. Lorenz. 1964, 70p
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Nuclear physics, Thermodynamics), (*Hydrodynamics, Lasers).

UCRL-12448 **Field 20G**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
FORMATION OF EXCITED HYDROGEN ATOMS FOR NEUTRAL INJECTION,
by John R. Hiskes. 14 Jun 65, 14p
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Hydrogen, Excitation), (*Particle beams, Particle accelerators).

UCRL-14193 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
SCATTERING PHASE SHIFT EQUATIONS AND RESONANCE EQUATIONS,
by L. David Roper. 21 May 65, 39p
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Elastic scattering, Phase shift), (*Equations, Elastic scattering).

UCRL-14194 **Field 20H, 20G**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
BEAM TRAJECTORIES UNDER THE INFLUENCE OF SELF-FIELDS AND EXTERNAL FOCUSSING ELEMENTS,
by J. W. Beal. 21 May 65, 18p
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Charged particles, Particle trajectories), (*Particle accelerators, Particle trajectories).

UCRL-16000 vols. I - II **Field 20G**
CFSTI Prices: HC$10.25 MF$3.75
Lawrence Radiation Lab., Univ. of California, Berkeley.
200 BEV ACCELERATOR DESIGN STUDY.
Vols. 1 and 2.
Jun 65, 843p
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Strong focusing accelerators, Synchrotrons), (*Synchrotrons, Strong focusing accelerators), Design, Mechanical drawings, Proton accelerators.

UCRL-16058 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Berkeley.
ENERGY SPECTRA OF THE K PLUS PI 3 DECAY MODES.
Doctoral thesis,
by Douglas E. Greiner. 15 May 65, 48p
Contract W-7405-eng-48
Distribution: No limitation.

Descriptors: (*Meson reactions, Nuclear spectroscopy), (*K mesons, Pions).

21. PROPULSION AND FUELS

LA-3229-MS **Field 21F, 18H, 10B, 20D,2**
CFSTI Prices: HC$7.00 MF$2.00
Los Alamos Scientific Lab., Univ. of California, N. Mex.
PROCEEDINGS OF AN ADVANCED NUCLEAR PROPULSION SYMPOSIUM,
comp. by Ralph S. Cooper. Jan 65, 371p
CONF-640410
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Nuclear propulsion, Symposia), (*Symposia, Nuclear propulsion).

LA-3286 **Field 21F, 18I**
CFSTI Prices: HC$4.00 MF$0.75
Los Alamos Scientific Lab., Univ. of California, N. Mex.
INTEGRAL GAMMA AND NEUTRON MEASUREMENTS ON THE KIWI 840-202 AND KIWI B4E-301 REACTORS,
by F. C. V. Worman, P. K. Lee, E. F. Montoya, and W. F. Schweitszer. 30 Mar 65, 101p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Rocket motors, Nuclear propulsion), (*Nuclear propulsion, Rocket motors), Nuclear reactors, Neutron flux, Gamma rays, Measurement.

LA-3296 **Field 21F, 18I**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
INTEGRAL GAMMA AND NEUTRON MEASUREMENTS ON THE NRX-A2 REACTOR,
by F. C. V. Worman and P. K. Lee. 12 Apr 65, 29p
Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Rockets motors, Nuclear propulsion), (*Nuclear propulsion, Rockets motors), Nuclear reactors, Neutron flux, Gamma rays, Measurement.

N65-15536 **Field 21H, 21B**
CFSTI Prices: HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
LIQUID ROCKET COMBUSTION PROCESSES.
Progress rept. no. 2,
by F. B. Cramer. 1964, 15p Rept. no. 4244-3
Contract NAS7 100
NASA CR-59498
Distribution: No limitation.

Descriptors: (*Rocket motors (Liquid propellant), Combustion), (*Liquid rocket propellants, Combustion).

N65-16840 **Field 21H**
CFSTI Prices: HC$3.00 MF$0.75
Rocketdyne, Canoga Park, Calif.
STABILITY RATING PROGRAM FOR LARGE ROCKET ENGINE SYSTEMS, PHASE II.
Final rept.,
by R. A. Byron. 19 May 64, 66p R-5504
Contract NAS8 1522
NASA CR-56114
Distribution: No limitation.

Descriptors: (*Rocket motors, Stability).

N65-19771 **Field 21H, 11F, 11C**
CFSTI Prices: HC$2.00 MF$0.50
Marquardt Corp., Van Nuys, Calif.
THE EVALUATION OF A TIN-ALUMINIDE OXIDATION RESISTANT COATING FOR REACTION CONTROL SYSTEM THRUST SYSTEMS APPLICATIONS.
Final rept. 26 Jul 63-1 Aug 64,
by R. C. Miller. 1 Aug 64, 38p TMC-S-430
Contract NAS91765
NASA CR-57308
Distribution: No limitation.

Descriptors: (*Thrust vector control systems, Corrosion inhibition), (*Corrosion inhibition, Coatings).

N65-23209 **Field 21D**
CFSTI Prices: HC$2.00 MF$0.50
Acoustica Associates, Inc., Los Angeles, Calif.
SENSOR FUEL DEPLETION.
Summary rept. 1 Jul 63-15 Mar 65,
by R. W. Remington. Mar 65, 33p DO-5872
Contract NAS8 5431
NASA CR-62593
Distribution: No limitation.

Descriptors: (*Monitors, Fuel consumption), (*Fuel consumption, Monitors), Fluid dynamic properties.

N65-29822 **Field 21H, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Tennessee Univ., Knoxville.
OPTIMUM CORRECTION OF THRUST TRANSIENT MEASUREMENTS,
by J. E. Irby and J. C. Hung. Jul 65, 20p
Grant NsG351
NASA CR-269
Distribution: No limitation.

Descriptors: (*Thrust, Transients), Corrections, Measurement, Rocket motors.

N65-33353 **Field 21I, 20D**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
MOTION OF LIQUID-VAPOR INTERFACE IN RESPONSE TO IMPOSED ACCELERATION,
by William J. Masica and Donald A. Petrash. Sep 65, 23p
NASA TND-3005
Distribution: No limitation.

Descriptors: (*Liquid rocket propellants, Fluid dynamics).

Patent 3,210,933 **Field 21H**
NOZZLE.
Patent assigned to Navy,
by John P. Crews and Albert L. De Haan. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Rocket motor nozzles, Guided missiles), Exhaust nozzles, Heat transfer, Sandwich construction, Honeycomb cores, Patents.

The nozzle structure lowers the heat transmissibility through the nozzle. The nozzle is designed for a polaris nozzle. A cellular core sandwich construction affords maximum heat reduction.

797-565 O - 66 - 17

Patent 3,211,414 **Field 21C**
THERMALLY OPERATED VALVE.
Patent assigned to NASA,
by John P. Bagby and Robert L. Zimmerman. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Valves, Thermostats), (*Ion engines, Valves), Cesium, Rocket motors, Springs, Patents.

The thermally operated valve may be used in the feed system of a cesium ion rocket engine. A thermally operated valve is provided for high temperature applications wherein a relatively large spring assisted positive closing pressure is employed to provide a gas-tight closure at a metal-to-metal seat, and yet a relatively small thermally expansive opening force is required to overcome the closing pressure and effect valve opening.

Patent 3,211,596 **Field 21I, 13H**
FABRICATION OF SOLID PROPELLANT POWDER GRAINS BY A POLYMERIZABLE SOLVENT EXTRUSION METHOD.
Patent assigned to Army,
by John F. Kincaid, Charles O. Metzger and Richard H. Cahill. 12 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Propellant grains, Extrusion), (*Rocket propellants, Extrusion), Material forming, Solvents, Polymerization, Nitrocellulose, Nitroglycerin, Acrylic resins, Stabilization, Ureides, Nitriles, Fatty acid esters, Patents.

Identifiers: Ethyl acrylate, Methyl acrylate, Methyl methacrylate.

The rocket propellants are made by thoroughly mixing 35 to 42 percent of nitrocellulose and 34 to 50 percent of nitroglycerin with 13 to 23 percent of a polymerizable monomer solvent such as methyl methacrylate plus one percent of diethyldiphenyl urea as a stabilizer and 0.04 percent azo-bis-isobutyronitrile as a catalyst. The mixture is extruded and cured at from 40 to 60 degrees C.

Patent 3,212,259 **Field 21E**
TERTIARY FLOW INJECTION THRUST VECTORING SYSTEM.
Patent assigned to NASA,
by Charles E. Kepler. 19 Oct 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Thrust vector control systems, Thrust augmentation), (*Secondary injection, Thrust augmentation), Propulsion, Patents, Nozzles, Boundary layer, Shock waves.

The tertiary flow injection thrust vectoring system adds to the secondary injection system disclosed in patent No. 3,144,752. The system involves the feature of a small amount of mass injection upstream of the secondary injection port to distort the primary stream boundary layer. This tertiary injection results in a significant increase in lateral thrust over that obtained in any pervious injection thrust vectoring system. The system is used in a propulsion vehicle.

Patent 3,214,910 **Field 21H**
IGNITER.
Patent assigned to Navy,
by Richard L. Hargett. 2 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Rocket igniters, Arming devices), Explosive initiators, Printed circuits, Patents.

The igniter is used for starting rocket motors. The disk type igniter has three major parts including a support body which is affixed to the rocket motir, a disk or shutter having gear teeth cut in a portion of its circumference and a printed circuit secured to its outer surface, and a block containing a pair of igniter squibs, a setting motor, and electrical connections, including the brushes that contact the printed circuit, for driving the motor and thereby rotating the disk.

Patent 3,215,572 **Field 21I**
LOW VISCOSITY MAGNETIC FLUID OBTAINED BY THE COLLOIDAL SUSPENSION OF MAGNETIC PARTICLES.
Patent assigned to NASA,
by Solomon S. Papell. 2 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Liquid rocket propellants, Magnetic materials), Viscosity, Patents, Colloids, Particles.

The fluid rocket propellant is for use in a zero gravity environment. It is made of a colloidal solution of a fuel and magnetizable particles of a size less than 0.25 micron in diameter whereby the propellant may be oriented and attracted by the imposition of a magnetic field. Nickel, cobalt, iron and the like may be used.

22. SPACE TECHNOLOGY

LA-3278 **Field 22B, 13A, 18B**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
SATELLITE HEAT PIPE,
by J. E. Doverall and J. E. Kemme. Jan 65, 21p

Contract W-7405-eng-36
Distribution: No limitation.

Descriptors: (*Satellites (Artificial), Heat transfer), (*Heaters, Radioactive isotopes), (*Pipes, Heat exchangers).

LA-3304 **Field 22A, 6R, 21F, 18I**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
INTEGRAL GAMMA AND NEUTRON MEASUREMENTS ON THE KIWI TNT,
by P. K. Lee and F. C. V. Worman. 3 May 65, 18p
Contract W-7405-eng-38
Distribution: No limitation.

Descriptors: (*Rocket motors, Nuclear propulsion), (*Nuclear propulsion, Rocket motors), Nuclear reactors, Neutron flux, Gamma rays, Measurement, Radiological dosage.

N-65-19928 **Field 22A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration. Langley Station, Va. Langley Research Center.
ADVANCED RESEARCH AND TECHNOLOGY IN THE AEROSPACE PROGRAM,
by Floyd L. Thompson. 16 Mar 65, 13p Rept. no. TMX-56202
Microfilmed from best available copy. Distribution: No limitation.

Descriptors: (*Astronautics, Scientific research).

N65-16437 **Field 22B, 22A**
CFSTI Prices: HC$6.00 MF$1.50
Space and Information Systems Div. North American Aviation, Inc., Downey, Calif.
MARINER B/VOYAGER ENTRY CAPSULE PRELIMINARY DESIGN STUDY,
Final rept.,
by M. G. Boobar. 10 Oct 63, 289p SID-63-1293
Contract JPL BE4 21764
NASA CR-53675
Distribution: No limitation.

Descriptors: (*Mars probes, Spacecraft), (*Spacecraft, Mars probes).

Identifiers: Mariner.

N65-16982 **Field 22D**
CFSTI Prices: HC$1.00 MF$0.50
Lear Siegler, Inc., Grand Rapids, Mich. Instrument Div.
DEVELOPMENT OF LAUNCH VEHICLE OPTIMIZATION SYSTEMS UTILIZING THE SYSTEM OPTIMIZATION AND REVIEW TECHNIQUE.
Progress rept. no. 2, 1-31 Aug 63. 1963, 4p
Contract NASW766
NASA CR-52514
Distribution: No limitation.

Descriptors: (*Optimization, Launch vehicles (Aerospace)), (*Launch vehicles (Aerospace), Optimization).

N65-17288 **Field 22A**
CFSTI Prices: HC$1.00 MF$0.50
Rensselaer Polytechnic Inst., Troy, N. Y.
GUIDANCE AND COMPUTER SCHEME FOR MANNED LUNAR LANDING,
by C. N. Shen. 1964, 7p
Contract NSG1459
NASA CR-56215
Presented at the Intern. Astronautical Congr. (15th). Distribution: No limitation.

Descriptors: (*Lunar probes, Soft landings), (*Soft landings, Lunar probes).

N65-17509 **Field 22A, 6M**
CFSTI Prices: HC$2.00 MF$0.50
Northrop Space Labs., Hawthorne, Calif.
STERILIZATION OF SPACE PROBES,
by R. W. Eppley. Feb 62, 30p NSL-62-26
Contract NAS7100
NASA CR-60875
Distribution: No limitation.

Descriptors: (*Space probes, Decontamination), (*Microorganisms, Space probes).

N65-17539 **Field 22B**
CFSTI Prices: HC$3.00 MF$0.75
Northrop Space Labs., Huntsville, Ala.
APOLLO LOGISTICS SUPPORT SYSTEMS MOLAB STUDIES. MOBILITY DEVELOPMENT TEST REQUIREMENTS, MOLAB LOCOMOTION SYSTEM,
by R. L. King, M. A. Sloan and W. B. Sponsler. Sep 64, 77p NSL-E30
Contract NAS8 11096
NASA CR-61033
Distribution: No limitation.

Descriptors: (*Spacecraft components, Tests).

Identifiers: Apollo.

N65-19266 **Field 22B, 13D**
CFSTI Prices: HC$6.00 MF$1.25
Martin Co., Baltimore, Md.
DESIGN TECHNIQUES FOR STRUCTURE-CRYOGENIC INSULATION INTEGRATION,
by R. G. Hannah and O. J. Bush. 25 Jan 65, 220p
Contract NAS85268
NASA CR-61038
Distribution: No limitation.

Descriptors: (*Thermal insulation, Tanks (Containers)), (*Tanks (Containers), Cryogenics).

N65-19759 Field 22B, 1C
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Washington, D. C.
SCIENCE AND TECHNOLOGY IN TRANSITION,
by Raymond L. Bisplinghoff. 1964, 12p
NASA TM-X-56148
Distribution: No limitation.

Descriptors: (*Spacecraft, Scientific research), (*Astronautics, Scientific research).

N65-19764 Field 22A, 22B
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Washington, D. C.
THE ROLE OF RESEARCH IN MANNED SPACE FLIGHT,
by John L. Sloop. 1964, 30p
NASA TM-X-56144
Distribution: No limitation.

Descriptors: (*Manned spacecraft, Scientific research), (*Space flight, Scientific research).

N65-19959 Field 22A, 5C
CFSTI Prices: HC$1.00 MF$0.50
Midwest Research Inst., Kansas City, Mo.
OPPORTUNITIES FOR THE PRACTICAL USE OF SPACE TECHNOLOGY BY BUSINESSMEN,
by Charles N. Kimball. 1961, 11p
NASA CR-60784
Microfilmed from best available copy. Distribution: No limitation.

Descriptors: (*Astronautics, Commerce).

N65-20418 Field 22B, 9F
CFSTI Prices: HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
TRACKING AND DATA HANDLING FOR THE PIONEER III AND PIONEER IV FIRINGS,
by Manfred Elmer and Robertson Stevens. 14 Aug 59, 37p PL-EP-701
Contract NASw6
NASA CR-5747
Distribution: No limitation.

Descriptors: (*Tracking, Space probes), (*Space probes, Telemetering data), Scientific satellites.

Identifiers: Pioneer.

N65-22162 Field 22A, 22B
CFSTI Prices: HC$5.00 MF$1.00
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
RANGER VII. PART II: EXPERIMENTERS' ANALYSES AND INTERPRETATIONS,
by Raymond L. Heacock, Gerard P. Kuiper, Eugene M. Shoemaker, Harold C. Urey, and Ewen A. Whitaker. 10 Feb 65, 156p JPL-TR-32-700
Contract NAS7 100
NASA CR-62347
Distribution: No limitation.

Descriptors: (*Photographs, Lunar satellites), (*Lunar satellites, Photographs), Lunar probes.

Identifiers: Ranger spacecraft.

N65-23934 Field 22B, 14B, 4A
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
GODDARD PROJECTS SUMMARY. SATELLITES AND SOUNDING ROCKETS.
1964, 38p Rept. no. TMX-56397
Microfilmed from best available copy. Distribution: No limitation.

Descriptors: (*Artificial satellites, Space probes), (*Sounding rockets, Scientific research).

N65-24310 Field 22A, 22B
CFSTI Prices: HC$3.00 MF$0.75
Stanford Univ., Calif. Stanford Electronics Labs.
BISTATIC-RADAR METHODS FOR STUDYING PLANETARY IONOSPHERES AND SURFACES,
Final rept. and Scientific rept. no. 2,
by Gunnar Fjeldbo. Apr 64, 95p Rept. no. SEL-64-025
Grants NSF G21543, NsG377
NASA CR-62823
Microfilmed from best available copy. Distribution: No limitation.

Descriptors: (*Bistatic radar, Space probes), (*Space probes, Bistatic radar).

N65-24567 Field 22D
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
SA-9, 8, and 10 DISPERSION ANALYSIS,
by Gerald Wittenstein and Jerry D. Weiler. 17 May 65, 63p NASA-TMX-53263
Distribution: No limitation.

Descriptors: (*Launch vehicles (Aerospace), Trajectories).

Identifiers: Saturn (Booster).

N65-24849 Field 22B
CFSTI Prices: HC$3.00 MF$0.75
Emerson Electric of St. Louis. Mo. Electronics and Space Div.
PERFORMANCE EVALUATION OF 'THERMOLAG' MATERIAL FOR ENTRY HEAT PROTECTION OF ADVANCED MANNED SPACECRAFT. VOL 4: BLISTER INVESTIGATIONS.
Final rept. 1 Oct 62-31 Jan 64.
28 Feb 64, 96p Rept. 1675 v4
Contract NAS9 877
NASA CR-65025
Distribution: No limitation.

Descriptors: (*Reentry vehicles, Heat-resistant materials), (*Heat-resistant materials, Reentry vehicles), Tests.

N65-26020 Field 22C, 21H
CFSTI Prices: HC$4.00 MF$1.00
National Aeronautics and Space Administration, Huntsville, Ala. Marshall Space Flight Center.
SATURN SA-9/PEGASUS A POSTFLIGHT TRAJECTORY,
by Jonathan B. Haussler and Robert H. Benson. 30 Apr 65, 134p
NASA TMX-53251
Distribution: No limitation.

Descriptors: (*Trajectories, Flight testing), Free flight trajectories, Orbital trajectories.

Identifiers: Saturn/Pegasus.

N65-26023 Field 22B, 10B
CFSTI Prices: HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
ANALYSIS OF SOLAR PANEL EFFECT ON LOUVER PERFORMANCE,
by Raymond A. Becker. 1 Jun 65, 16p JPL-TR-32-687
Contract NAS7 100
NASA CR-63385
Distribution: No limitation.

Descriptors: (*Solar panels, Temperature control), (*Temperature control, Spacecraft), Performance (Engineering).

N65-26077 Field 22D
CFSTI Prices: HC$3.00 MF$0.50
Rosemount Engineering Co., Minneapolis, Minn.
DEVELOPMENT OF SENSOR TO MEASURE HOT GAS LEAKS FROM FLANGES AND SEALS IN PLUMBING OF SATURN VEHICLE.
Summary rept. 30 Jun 63-30 Jun 64.
8 Jul 64, 53p REC-7648
Contract NAS8-5451
NASA CR-63281
Distribution: No limitation.

Descriptors: (*Gas leaks, Monitors), (*Launch vehicles (Aerospace), Gas leaks), Seals (Stoppers), Pipes.

N65-26079 Field 22C
CFSTI Prices: HC$6.00 MF$1.25
Philco Research Labs., Newport Beach, Calif.
ANALYSIS OF THE PROJECT FIRE RE-ENTRY PACKAGE FLOW FIELD.
Final technical rept.,
by W. C. Kuby, S. R. Byron, R. M. Foster, R. F. Hoglund and M. Holt. 8 Oct 64, 203p U-3020
Contract NAS1 3419
NASA CR-63388
Distribution: No limitation.

Descriptors: (*Reentry vehicles, Atmosphere entry), (*Atmosphere entry, Reentry vehicles).

Identifiers: Apollo, Fire project.

N65-26082 Field 22A, 14B
CFSTI Prices: HC$2.00 MF$0.50
Univ. of San Diego, California. Marine Physical Lab.
EXPERIMENTAL RESEARCH ON TECHNIQUES FOR DETERMINATION OF MAGNETIC PROPERTIES OF LUNAR AND PLANETARY MATERIALS.
Final rept.,
by Victor Vacquier. 1 Mar 65, 50p MPL-U-2/65
Grant NsG303
NASA CR-63381
Distribution: No limitation.

Descriptors: (*Space probes, Instrumentation), (*Moon, Magnetic properties).

N65-27298 Field 22D
CFSTI Prices: HC$5.00 MF$1.25
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
CONTROL THEORY HANDBOOK,
by Doyle Garner. 22 Apr 64, 187p Rept. no. TMX-53036
Microfilmed from best available copy. Distribution: No limitation.

Descriptors: (*Handbooks, Control), (*Control, Handbooks), (*Launch vehicles (Aerospace), Control).

N65-27641 Field 22A, 01A
CFSTI Price: MF$2.50
National Aeronautics and Space Administration, Washington, D. C. Scientific and Technical Information Div.
ASTRONAUTICS AND AERONAUTICS, 1964-CHRONOLOGY ON SCIENCE, TECHNOLOGY, AND POLICY,
by Eugene M. Emme. 1965, 533p
NASA SP-4005
Handcopy available from Superintendent of Documents, GPO, Wash., D. C. 20402, $1.75. Distribution: No limitation.

Descriptors: (*Astronautics, Reviews), (*Aeronautics, Reviews).

N65-28332 **Field 22A, 5I**
CFSTI Price: MF$0.50
National Aeronautics and Space Administration, Washington, D. C. Scientific and Technical Information Div.
THE NATURE AND SCOPE OF THE NASA UNIVERSITY PROGRAM,
by T. L. K. Smull. 1965, 41p
NASA SP-73
Handcopy available from Superintendent of Documents, G.P.O. Wash., D. C. 20402, $0.25. Distribution: No limitation.

Descriptors: (*Astronautics, Universities), (*Education, Astronautics).

N65-31139 **Field 22B**
CFSTI Prices: HC$3.00 MF$0.50
Allied Research Associates, Inc., Concord, Mass.
AEROSPACE PRESSURE VESSEL DESIGN SYNTHESIS,
by George Gerard. Aug 65, 59p
Contract NASw928
NASA CR-287
Distribution: No limitation.

Descriptors: (*Pressure vessels, Design), (*Spacecraft, Pressure vessels).

N65-31143 **Field 22C**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration. Greenbelt, Md. Goddard Space Flight Center.
APOLLO ENTRY TRACKING: A SHIPBOARD UNIFIED S-BAND INTERFEROMETER SYSTEM,
by F. O. Vonbun. Aug 65, 28p
NASA TND-2880
Distribution: No limitation.

Descriptors: (*Tracking, Reentry vehicles), (*Interferometers, Tracking), Spacecraft.

N65-32395 **Field 22D**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration. Langley Station, Va. Langley Research Center.
A METHOD OF DETERMINING MODAL DATA OF A NONUNIFORM BEAM WITH EFFECTS OF SHEAR DEFORMATION AND ROTARY INERTIA,
by Vernon L. Alley, Jr., Robert J. Guillotte, and Lessie D. Hunter. Sep 65, 41p
NASA TND-2930
Distribution: No limitation.

Descriptors: (*Launch vehicles (Aerospace), Deformation), (*Beams (Structural), Deformation).

N65-32646 **Field 22D**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration. Langley Station, Va. Langley Research Center.
EXPLORATORY EXPERIMENTAL AERODYNAMIC INVESTIGATION OF TENSION SHELL SHAPES AT MACH 7,
by James C. Robinson and Alfred W. Jordan. Sep 65, 43p
NASA TND-2994
Distribution: No limitation.

Descriptors: (*Reentry vehicles, Aerodynamic configurations).

N65-33357 **Field 22B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Edwards, Calif. Flight Research Center.
FLIGHT-DETERMINED LOW-SPEED LIFT AND DRAG CHARACTERISTICS OF THE LIGHTWEIGHT M2-F1 LIFTING BODY,
by Victor W. Horton, Richard C. Eldredge, and Richard E. Klein. Sep 65, 44p
NASA TND-3021
Distribution: No limitation.

Descriptors: (*Reentry vehicles, Model tests).

N65-33541 **Field 22D**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
BALLOON TANK SKIN STRAIN MEASUREMENTS AT LIQUID-HYDROGEN TEMPERATURE ON CENTAUR FLIGHT VEHICLE,
by Tilak R. Lall, Frank A. Maruna, andWilliam F. Lang, Jr. Sep 65, 21p
NASA TM X-1147
Distribution: No limitation.

Descriptors: (*Launch vehicles (Aerospace), Fuel tanks), (*Fuel tanks, Strain (Mechanics)).

Identifiers: Centaur.

N65-33549 **Field 22B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Edwards, Calif. Flight Research Center.
DESIGN AND OPERATIONAL CHARACTERISTICS OF A LUNAR-LANDING RESEARCH VEHICLE,
by Donald R. Bellman and Gene J. Matranga. Sep 65, 52p
NASA TND-3023
Distribution: No limitation,

Descriptors: (*Lunar craft, Design).

NAA-SR-11353 **Field 22B, 18N**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
AEROSPACE SAFETY PROGRAM-SAFE DISPOSAL OF SNAP REACTORS,
by R. L. Detterman, A. Weitzberg, C. A. Willis. 25 Jul 65, 41p
Contract AT-11-1-GEN-8
Distribution: No limitation.

Descriptors: (*Power reactors, Spacecraft), (*Safety, Power reactors).

Identifiers: SNAP.

PB-168 572 **Field 22C, 17H**
CFSTI Prices: HC$4.00 MF$1.00
Smithsonian Institution, Cambridge, Mass. Astrophysical Observatory.
CATALOG OF PRECISELY REDUCED OBSERVATIONS NO. P-14.
3 Sep 65, 129p Special rept. no. SAO-SR-185
Grant NsG-87-60
Distribution: No limitation.

Descriptors: (*Satellites (Artificial), Optical tracking), (*Optical tracking, Satellites (Artificial), Astronomical data, Orbital trajectories, Position finding, Azimuth, Catalogs.

Identifiers: Echo, Explorer, Injun 1, Midas, Relay (Satellite), Telstar, Transit, Vanguard.

The positions are listed of artificial satellites as obtained by the SAO Photoreduction Division from the precise reduction of the films taken at the 12 Baker-Nunn Camera Stations. This catalog includes 545 observations of Satellite 1959 alpha-1 (Vanguard 2), 276 observations of Satellite 1959 eta-1 (Vanguard 3), 960 observations of Satellite 1960 iota-2 (Echo 1 Rocket Body), 1230 observations of Satellite 1961 delta-1 (Explorer 9), 212 observations of Satellite 1961 omicron-1 (Transit 4A), 166 observations of Satellite 1961 omicron-2 (Injun), 775 observations of Satellite 1961 alpha-delta-1 (Midas 4), 601 observations of Satellite 1962 alpha-epsilon-1 (Telstar 1), and 375 observations of Satellite 1962 beta-upsilon-1 (A15 Relay). Observation cover Jan. 1, 1963-March 31, 1963.

SC-DR-64-1741 **Field 22B, 22C**
CFSTI Prices: HC$2.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
ENVIRONMENTAL TESTING OF THE RFD-2 RE-ENTRY VEHICLE,
by D. L. Krenz. Feb 65, 35p
Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Re-entry vehicles, Environmental tests), Test methods.

Identifiers: RFD-2 re-entry vehicle.

SC-RR-65-129 **Field 22B, 18N**
CFSTI Prices: HC$2.00 MF$0.50
Sandia Corp., Albuquerque, N. M.
STABILITY ANALYSIS OF THE RFD-2 FLIGHT TEST VEHICLE,
by F. L. Paris. Jun 65, 40p
Contract AT (29-1)-789
Distribution: No limitation.

Descriptors: (*Reentry vehicles, Flight testing), (*Test vehicles, Aerodynamic characteristics).

Identifiers: RFD-2 reentry vehicle.

SUBJECT INDEX

The fields indicated here apply only to the Other Research Reports and Related Material Section (on blue paper).

DESCRIPTOR	FLD	ACCESS. NO.
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